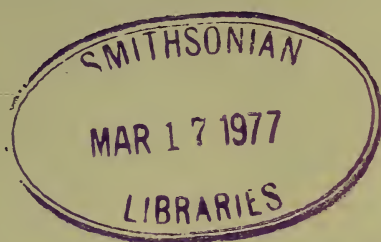








BRILL MAGAZINE



Jefferson St.,
Louisville, Ky.



A BRAKE-HANDLE that stands the racket and stands it year in and year out—that is the Brill ratchet brake-handle. For years the handle has withstood the hardest kind of tests, the sharpest of competition, and to-day it still holds its place as the standard handle in the electric railway field. Its parts are rugged, simple and strong, made in our own foundry by our own experts, and of bronze that we know to be the real thing. It is built for service of the kind that you want, the kind you should demand from a handle. Besides, it has won its place, not only with the operators and managers of the field, but with the man even more directly concerned—the motorman. He likes it because he knows what it will do, the service it gives. Why shouldn't he have it?



A. M. Leonard

PRESIDENT, PUGET SOUND TRACTION, LIGHT & POWER COMPANY

Enthusiasm is the thing in a man's makeup which stirs him to make many good New Year's resolutions; determination is the measure of the worth of enthusiasm.

Inspiration leads man to try new things, to seek new ways, to climb; understanding is the attribute which materializes inspiration.

Optimism pulls a man up to a better working plane, keeping him right with himself and with the world; ability crystallizes optimism.

Enterprise starts a man off along new paths; resourcefulness keeps him on the best of those paths and furnishes him with a spur through life.

Initiative lifts man out of his time-worn ruts; fitness keeps him on the crown of the road.

And, above all, responsibility, together with an amalgam of all these attributes, brings success.

JANUARY 15, 1916

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ALTON W. LEONARD

ALTON W. LEONARD, President of the Puget Sound Traction, Light & Power Company, with headquarters in Seattle, Washington, was born in Maine in 1873. At the age of twenty-two he entered the service of Stone & Webster at Brockton, Mass., taking the position of bookkeeper in the Edison Light Company, of that place. In seven years he advanced himself to the post of Manager of the company. Later, having demonstrated his worth in Brockton, Mr. Leonard was moved to Houghton, Mich., where he was placed in charge of the Stone & Webster companies. Four years later he was made Manager of the Minneapolis General Electric Company. This was followed by his selection for the post of Vice-President of the same corporation and later for the position of District Manager of all the Stone & Webster interests in the middle west. In October, 1912, Mr. Leonard was selected for the position of Vice-President and General Manager of the Puget Sound Traction, Light & Power Company, which post he held until one year ago, when he was made President of the company.

INTERURBAN CENTERS AND INTERURBAN CARS

LOUISVILLE

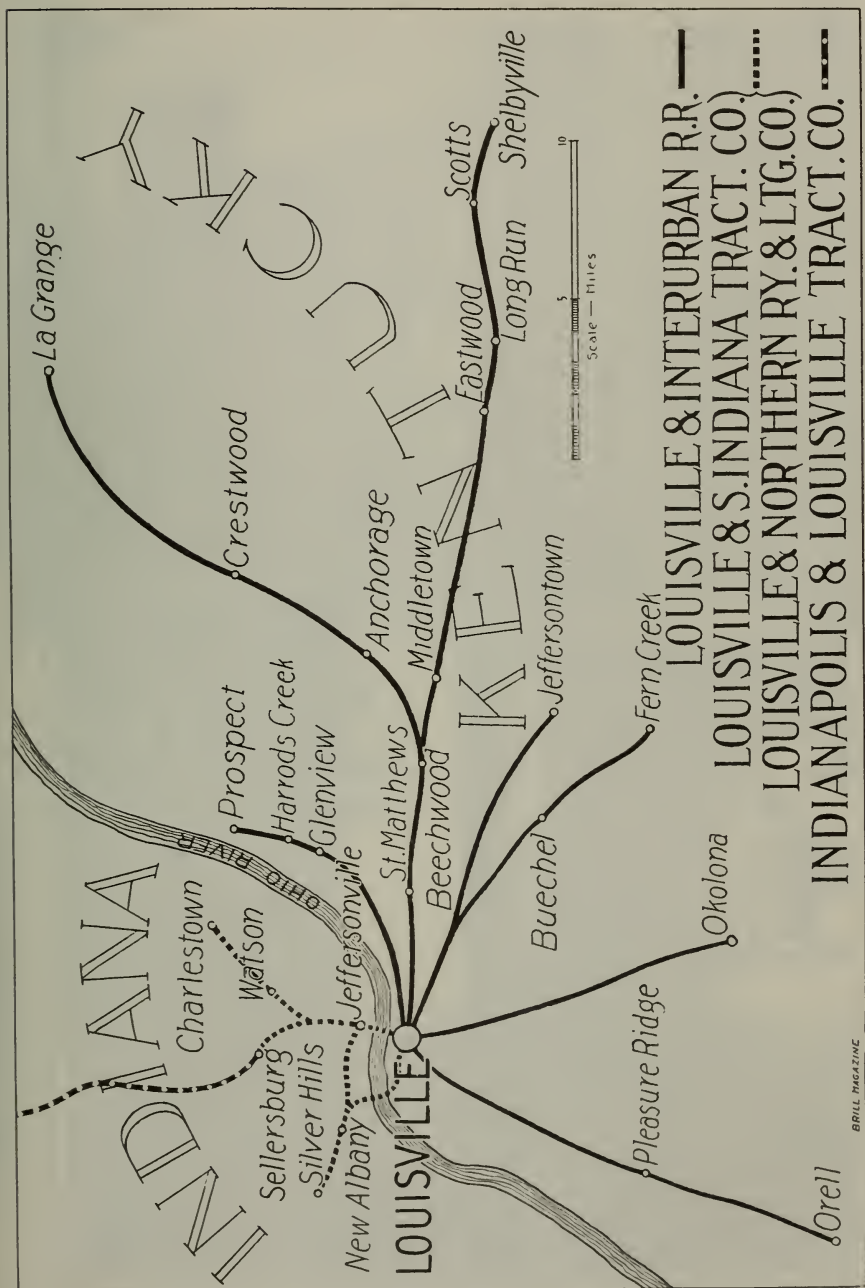


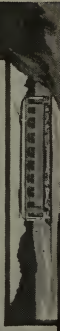
LOCATED almost in the center of population, with convenient rail and river facilities, unlimited supply of soft water throughout the year and cheap coal from eastern and western Kentucky by rail, and from western Pennsylvania by water, cheap gas and electric power and an abundance of raw materials available, Louisville, the largest city in Kentucky, has grown to be one of the chief commercial and manufacturing centers of the middle-western United States. The climatic conditions of the city are suitable for manufacturing, and the easy accessibility of large markets helps the progress of the city. The city lies on the south bank of the Ohio River, and is surrounded almost entirely by foothills. Its situation is about 120 miles southwest of Cincinnati and about 300 miles northeast of the juncture of the Ohio and Mississippi Rivers. A permanent nine-foot stage of the Ohio River is fast nearing consummation, and with the opening of the Panama Canal, which brings Louisville, via the Ohio, Mississippi and the Gulf of Mexico, nearer to the Pacific Coast than is the city of New York, the city's importance as an industrial center has been greatly augmented, especially in view of the almost

limitless timber and mineral resources of contiguous territory.

Some of the largest manufacturing plants of the country are located at Louisville. Whiskey forms one of the largest items of manufacture, the city having more than 66 distilleries with a total annual capacity of 25,000,000 gallons. Also, there is located in the city one of the largest hardware factories in the world. The stockyard and packing house industries of the city are of considerable importance. As a residence city it is well equipped, possessing its own reservoir and water filtration plants. The annual death rate is about fourteen. Located close to the city is the well-known Mammoth Cave, drawing to it annually a horde of tourists. Also, the city is popular for the holding of conventions because of its physical qualifications for taking care of the large crowds. In addition, there are three notable museums located at Louisville, thus helping swell the number of visitors to the city. Other points of interest for the tourist are French Lick Springs, West Baden, Olympian Springs, Dawson and the far-famed Blue Grass region of Kentucky. Scenes of historical interest centering about Abraham Lincoln, Daniel Boone, George Rogers Clark, Zachary Taylor and others notable in American history lie in and around Louisville.

Louisville is the largest leaf tobacco market in the world, forming





LOUISVILLE & INTERURBAN RAILROAD

Station at Anclorage, La Grange Division
 Floyd Fork, Shelbyville Division, Trestle and bridge
 Bridge over N. R. R. near Anclorage, La Grange Division
 Beechwood Junction, Shelbyville and La Grange Divisions



INTERURBAN CENTERS AND CARS. Terminal station of Louisville & Interurban Railroad on Jefferson Street

a clearing house for the crop of the whole state of Kentucky. In addition, during the last few years, activities have been begun in fruit-growing throughout Kentucky and southern Indiana, and these activities give promise of making Kentucky a leading fruit state and Louisville a leading fruit center. The popular girls' and boys' corn-growing clubs had their origin at Louisville, and their good influence, it is freely predicted, will do much toward increasing

Louisville's prestige as an agricultural center.

The city occupies forty square



Campbell Street plant, Louisville Railway Company



INTERURBAN CENTERS AND CARS. Third Street, Louisville, near terminal station

miles of a plain, about seventy square miles in area, lying about sixty feet above the low-water mark of the river and nearly enclosed by hills. The city extends for eight miles along the river, which is spanned by three bridges and which falls twenty-six feet in

three miles at this point. Trading in cement and mules is notably large, and that in pork, wheat, Indian corn, coal and lumber is extensive.

The natural advantages for progress which the city has enjoyed have been supplemented by those



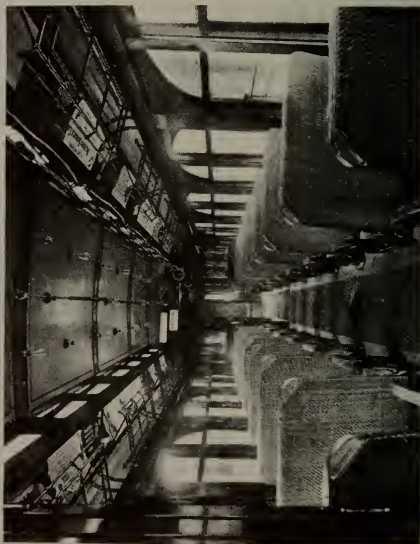
INTERURBAN CENTERS AND CARS. Exterior of freight station, Louisville & Interurban Railroad



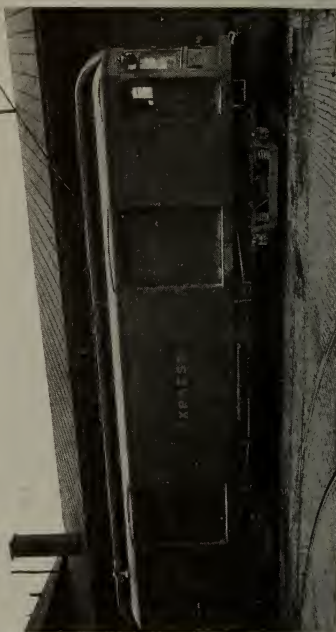
INTERURBAN CENTERS AND CARS. High Street Station, Louisville Railway Company



La Grange passenger car and trailer
Typical interior



LOUISVILLE & INTERURBAN RAILROAD



Shelbyville passenger car
Express car



INTERURBAN CENTERS AND CARS. Two-car train loaded with stone, Louisville & Northern Railway & Lighting Company

given it by the good transportation lines radiating from Louisville. The city has excellent connections with all parts of the country, a number of the largest railroads serving it. In addition, interurban electric railways radiating out of it and traversing the surrounding country make for progress. These lines are the Louisville & Interurban Railroad Company, which is controlled by the Louisville Railway Company, operating the city lines; the Louisville and Southern Indiana Traction Company, and the Louisville and Northern Railway and Lighting Company.

The Louisville and Interurban Railroad operates seven divisions out of the city. One of these divisions runs almost due south to Orell, a distance of about fifteen miles; another runs ten miles southeast to Okolona; two others

run out of Louisville on the same tracks to Doup's Point, five miles from the city, where they divide, one running to Fern Creek, a distance of 12 miles, and the other terminating at Jeffersontown, about thirteen miles from the city, both towns being to the south and east of the city; the Shelbyville and La Grange Divisions also leave the city over the same tracks, branching from each other at Beechwood Junction, a run of eight miles, the one division running almost due east to Shelbyville, a distance of



Glenwood Bridge over Silver Creek, Louisville & Northern



INTERURBAN CENTERS AND CARS. Typical scene along lines of Louisville & Southern Indiana Traction Company

thirty-one miles, and the other running in a general northeasterly direction to La Grange, twenty-seven miles from Louisville; the last division is but twelve miles long and runs northeast to Prospect, following roughly the course of the Ohio River.

On the Prospect Division a fare of fifteen cents is charged for the run of twelve miles; on the Orell Division, a run of fifteen miles, the fare is twenty cents; on each of the three divisions serving Jefferson-town, Okolona and Fern Creek,

2,486,996. The statistics show the average receipts per passenger to be $12\frac{1}{4}$ cents.

The total tributary population of the system has been estimated at 50,000, the populations of the cities and towns along the seven divisions totalling 12,000. Altogether the company operates 100 miles of track, of which 90 miles are laid with single track, five miles are siding and five miles double track. The power used by the company is furnished it by the Louisville Railway Company, its controlling com-

pany, two steam powerplants with present and ultimate capacity of 15,800 and 27,800 kw. being located in Louisville. The transmission lines are 13,250 volts. the current being fed into the trolley lines at from 500 to 600 volts.

The company has in operation two interesting types of in-



Glenwood Park, Louisville & Southern Indiana Traction Company

terurban cars. One of these types measures 49 ft. 9 in. over the vestibules, 51 ft. 1 in. over the bumpers, 8 ft. 5 in. over the side sheathing, has a seating capacity of 51 persons, a weight of carbody of 33,600 lb. and a total weight of 66,800 lb. The other type measures 54 ft. 8 in. over the vestibules, 56 ft. over the bumpers, 8 ft. 10 in. over the side sheathing, has a seating capacity of 52 persons and a carbody weight of 34,500 lb., the total weight being 73,800 lb. The cars are designed for single- and double-end operation. The lighter car of the two is of all-steel construction, mounted on a steel underframe, while the larger car is built with a wooden sheathing, mounted on a composite underframe. The cars are operated for the most part singly, but in some cases they are run with trailers.

The company does a freight and express business of a general nature, hauling farm products, building materials and freight of a general nature. Outside of the city the lines of the company are operated over private right-of-way, public highways not being used on any portion of the lines. As a consequence,



INTERURBAN CENTERS AND CARS. Typical passenger car in use on lines of Louisville & Southern Indiana Traction Company

fast schedules are maintained and the cars are equipped with motors designed to give the cars a maximum speed of forty-five miles per hour, the cars averaging three stops to the mile. For normal operation of all its divisions the company uses twenty-five cars, but has a total of 42 motor and seven trail cars available for use.

The Louisville and Southern Indiana Traction Company is a subsidiary of the Middle West Utilities Company. It operates be-



Double-track bridge spanning Ohio River, Louisville & Northern Railway & Lighting Company



INTERURBAN CENTERS AND CARS. Louisville & Northern passenger car
Daisy Division

tween New Albany and Jeffersonville and between Jeffersonville and Louisville, entering Louisville over the C. C. C. & St. L. Bridge. It also operates ten miles of street railway lines in New Albany, leasing the lines of the New Albany Street Railroad Company. The company is the result of the absorption of the Jeffersonville City Railway and the Southern Indiana Interurban Railway Company, which controlled the Jeffersonville.

New Albany & Sellersburg Rapid Transit Company.

The total tributary population of the system is estimated at 282,400, the population of the cities and towns along the route being 12,000. The company operates 24 miles of single track and 9 miles of double track. Power for the operation of the lines is purchased, the transmission voltage being 6600 and the line voltage 500, a sub-station being located at Jeffersonville.

The standard car in use measures 47 ft. over the bumpers, 46 ft. over the vestibules, 8 ft. 7 in. over the side sheathing, has a seating capacity of 50 persons, a carbody weight of 29,959 lb. and a total weight of 59,740 lb. The car is designed for double-



Sub-station, passenger station and interlocking plant, Watson Junction, Louisville & Northern Railway & Lighting Co.

end operation, being built on a wooden underframe, and is operated both singly and in trains. The company does a general freight and express business, hauling stone and general merchandise and small fruits and vegetables.

For the operation of its schedules it uses under normal conditions 29 passenger cars and has a total of 48 cars available. The maximum speed attained on the lines is 45 miles per hour, with an average of six stops per mile, the lines being operated outside of the cities on private right-of-way. The traffic statistics for the last year show a total of 5,769,693 passengers carried, with a car mileage of 1,161,724. The figures also show 52,625 tons of freight and 30,493 pieces of express matter carried.

The Louisville & Northern Railway & Lighting Company also is a subsidiary of the Middle West Utilities Company. It operates interurban lines connecting Louisville, Jeffersonville, New Albany, Watson and Sellersburg, Ind., with a branch running to Charlestown, Ind. The company operates over the lines of the Kentucky and Indiana Bridge and Railway Company between Louisville and New Albany and connects with the Indianapolis & Louisville Traction Company at Sellersburg, Ind.



Typical freight car. Louisville & Southern Indiana Traction Company

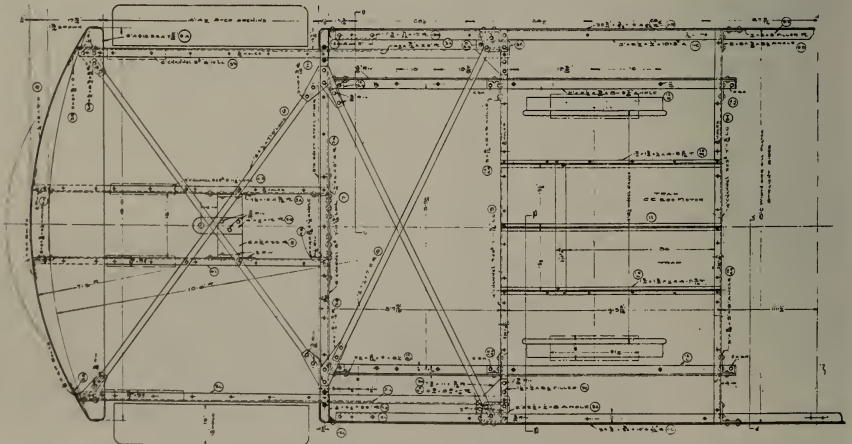
The standard car in use by the company measures 37.3 ft. over the bumpers, 36.3 ft. over the vestibules, has a width of 8.4 ft. over the side sheathing, a seating capacity of 58 persons, a carbody weight of 26,180 lb. and a total weight of 58,305 lb. The car is built on a composite underframe and designed for double-end operation, being run singly and in trains of from two to six cars. The company handles general freight and express, carrying stone and general merchandise. For the normal operation of its schedules it has in use 18 cars, with a total of 21 available. Outside of the cities the lines of the company are laid on private right-of-way. The traffic statistics for the last year show a total of 2,399,317 passengers carried with a car mileage of 393,615 and a total of 50,798 tons of freight and 30,493 pieces of express matter hauled.



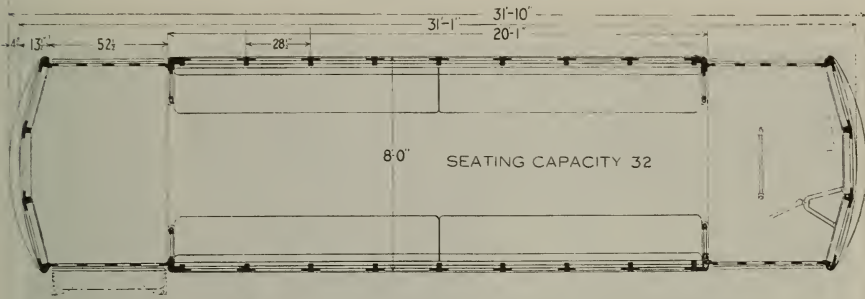
THREE TYPES FOR FORT DODGE, DES MOINES & SOUTHERN

THE Fort Dodge, Des Moines & Southern Railroad Company, of Boone, Iowa, has received from the American Car Company, of St. Louis, three interesting types of cars for use on its lines—a 20-ft. closed motor car, a 42-ft. center-

entrance combination motor car, and a 57-ft. combination passenger, smoking and baggage car, the latter two each mounted on Brill 27 M. C. B. trucks, designed to carry out the high-speed schedules of the interurban lines of the company,



FORT DODGE, DES MOINES & SOUTHERN CARS. The side sills are plated with $\frac{3}{8}$ -in. steel. The end sills and crossings are of wood



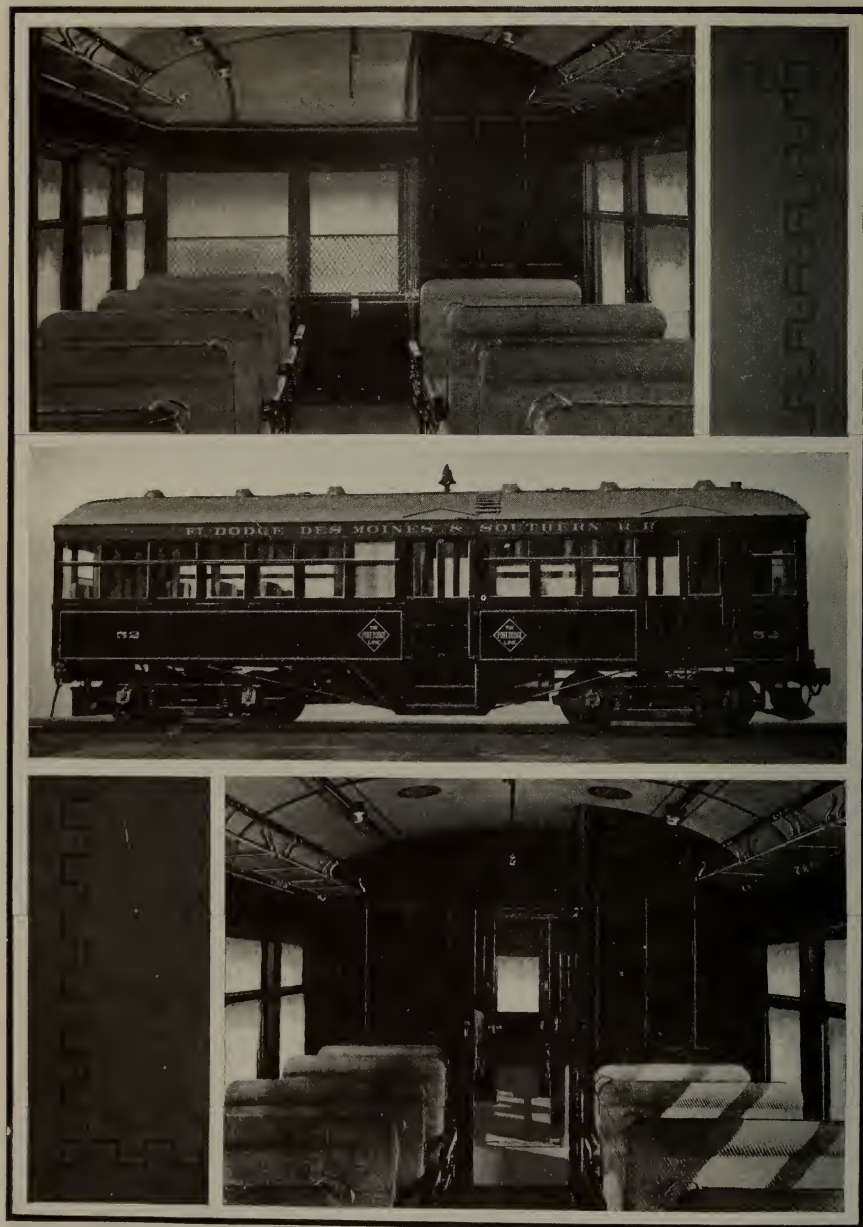
FORT DODGE, DES MOINES & SOUTHERN CARS. Height from track to underside of side sills, 28 $\frac{3}{8}$ in.; height from underside of side sills over trolley boards, 9 ft. 0 $\frac{1}{2}$ in.; height from floor to center of headlining, 8 ft. 1 $\frac{3}{8}$ in.; track to step, 15 in.; step to platform, 12 in.; platform to floor, 8 in.; weight of carbody without electrical equipment, 11,000 lb.; weight of truck less wheels and axles, 2975 lb.

and the small car mounted on a Brill 21-E. This small car is for use on the city lines of the company in Fort Dodge, a city of 20,000, where the traffic is exceedingly light.

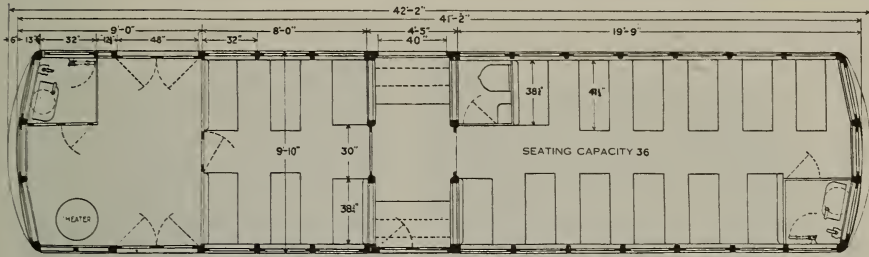
The use of the single-truck car shows the firm belief of the officials of the company in the economic operation of light-weight, single-truck equipment. The center-entrance car is to be used on the main line



FORT DODGE, DES MOINES & SOUTHERN CARS. Outside, the car is sheathed with steel; inside, it is finished in quartered oak



FORT DODGE, DES MOINES & SOUTHERN CARS. This car, a combination passenger, smoking and baggage car with a center entrance, is mounted on Brill 27-M.C.B. trucks, it being the desire of the company to use it on high-speed service



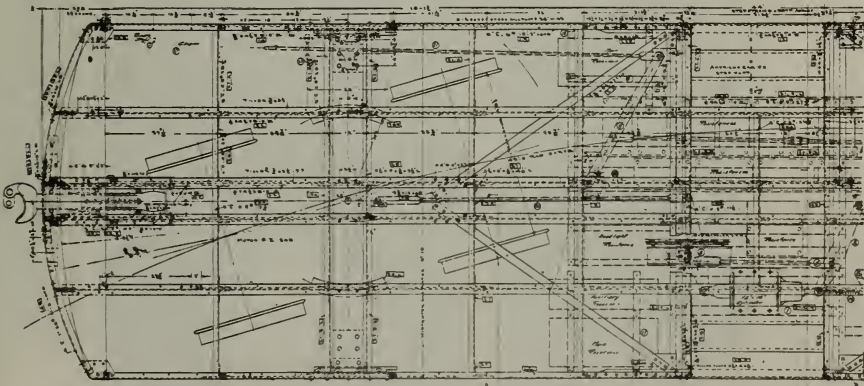
FORT DODGE, DES MOINES & SOUTHERN CARS. Height from track to underside of side sills, 42 in.; height from underside of side sills over trolley boards, 9 ft. 5 1/2 in.; height from floor to center of headlining, 8 ft. 4 in.; track to step, 16 in.; step to platform, triple steps of 11 1/2 in.; weight of carbody without electrical equipment, 24,000 lb.; weight of two trucks, 21,840 lb.

of the company between Boone and Ames, a distance of twenty-one miles, and the large car is for use on the main line of the company between Fort Dodge and Des Moines, a distance of eighty-seven miles. On this line, especially, the company keeps its schedules at a high pitch, maintaining an average speed of forty-four miles per hour, which speed is made possible not only through the design of the equipment, but also because of the fact that the lines are so arranged that there is an average of but one stop to the mile. Over all its inter-urban lines the company operates

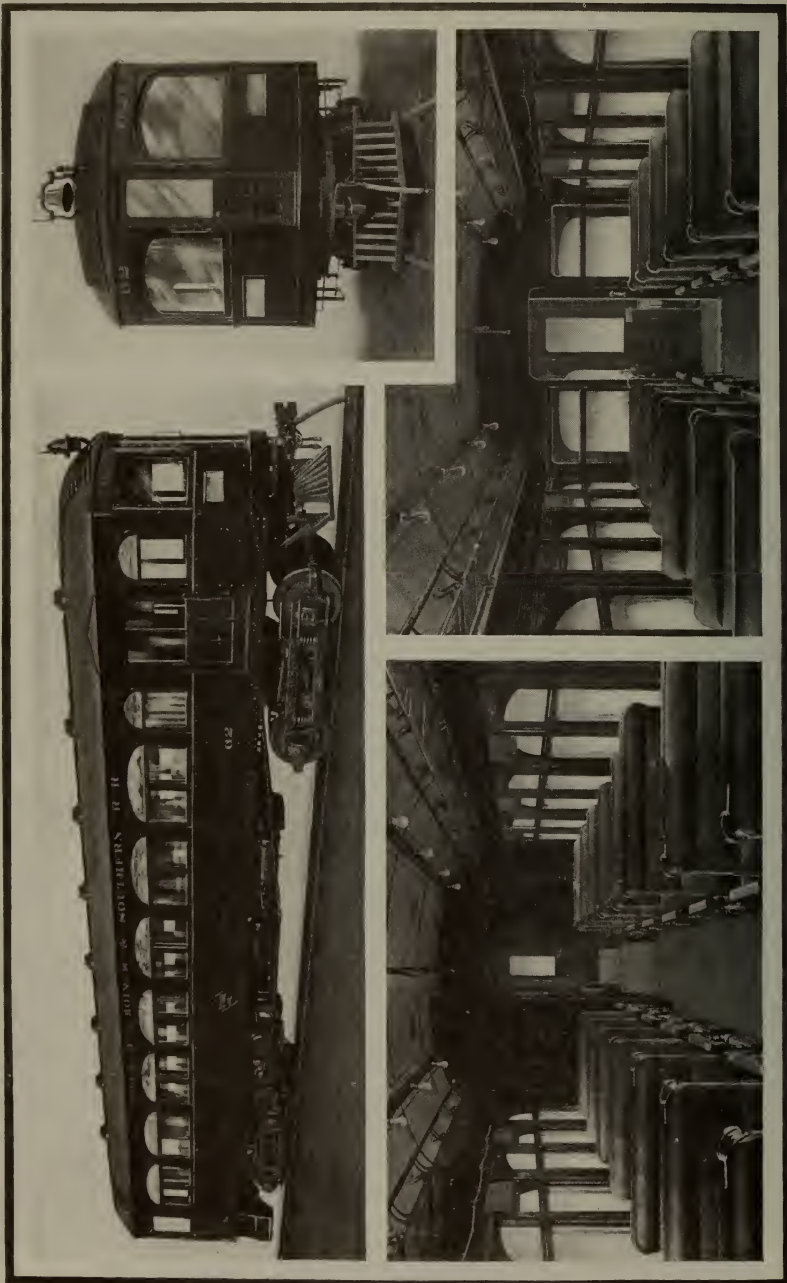
on a fare basis of two cents to the mile, the collection of fares being by the standard steam railroad methods.

The principal cities served by the company are Fort Dodge, at the northern terminus, with a population of 20,000; Boone, 43 miles south of Fort Dodge, a city of 12,000; Ames, the terminus of a short branch running north from Kelley, a city of 6,000; and Des Moines, the southern terminus, a city of 110,000.

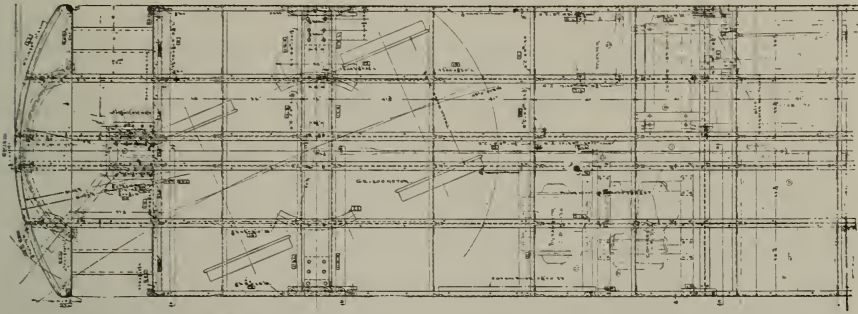
The operation of the system is very similar to that of a standard steam railroad. In Des Moines the



FORT DODGE, DES MOINES & SOUTHERN CARS. The underframe of the car is of all-steel construction, wooden posts being used, however, in the construction of the body frame



FORT DODGE, DES MOINES & SOUTHERN CARS. This car also is mounted on Brill 27-M.C.B. Trucks, built to maintain high speeds. The operation calls for an average speed of 44 miles per hour, the average number of stops being but one to the mile.



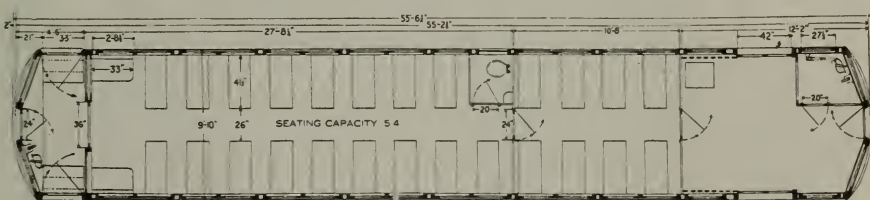
FORT DODGE, DES MOINES & SOUTHERN CARS. Pullman-style sash are used throughout the main passenger compartment, the car being further protected by storm sash

company uses the Rock Island tracks and the Rock Island station. At the other extremity of the system, or in Fort Dodge, the cars are looped. The roadbed is ballasted with gravel, single-track throughout. Commercial baggage is handled on all trains, the same as on the steam railroads in the same territory, the company also making it a rule not to allow passengers to ride in the baggage compartment. The handling of freight plays a very important part in the company's operation, practically 60 per cent. of the earnings of the company being derived from the freight traffic, and it is stated that the company is the heaviest freight-carrying interurban electric railway in the country. This is brought about principally through

the industries of the cities served, Boone being a heavy producer of coal and Fort Dodge the largest producer of gypsum and gypsum products in the west. Power for the operation of its lines is generated at the company's own powerhouse at Fraser, Iowa, a short distance above Boone.

The 20-ft. car is a typical single-truck motor car, the carbody weighing, without the electrical equipment, only 11,000 lbs., which lightness in weight is well appreciated when the fact that the car has a seating capacity of 32 persons is taken into consideration. Outside the car is sheathed in steel, the inside being finished in quartered sawed oak.

In the underframe of the car the side sills are of yellow pine $3\frac{3}{4}$ by



FORT DODGE, DES MOINES & SOUTHERN CARS. Height from track to underside of side sills, 42 in.; height from underside of side sills over trolley boards, 9 ft. 5½ in.; height from floor to center of headlining, 8 ft. 4 in.; track to step, 16 in.; step to floor, triple steps 11½ in. deep; weight of carbody without electrical equipment, 30,000 lb.; weight of two trucks, 22,560 lb.

75½ in., plated with 12 by ¾-in. plate, the end sills are of white oak and the crossings also of oak, 3 9-16 by 6 1-16 in., fitted into the steel sill.

The 42-ft. center-entrance car is a combination passenger, smoking and baggage type. The two-leaf doors at the center-entrance are arranged to swing in and on each side of the baggage compartment there are provided two single swing doors, having a door opening of 48 in. On each side of the center platform leading into the main passenger compartment and into the baggage compartment there is installed a single sliding door in the bulkhead. The partition separating the baggage compartment and the smoking compartment is equipped with a single swing door.

In the right-hand forward corner of the car there is installed a motorman's cab with solid panel to the rear and with stationary panel and door to the motorman's left.

The underframe of the car is of all-steel construction. The side sills are of 6-in. channel, the two center and two intermediate sills 6-in. I-beams, the center cross sills of 6-in. channel, and on each side of the center platform there is installed an 8-in. needle-beam, 18-lb. section. The center and intermediate I-beam sills extend from end to end of the car. The steps at the center entrance are triple, each opening enclosed with American Car Company's type of step flap.

In the body framing of the car the side posts are 2½ in., the corner posts 3¾-in. ash. The outside sheathing of the car is of steel,

extending from the lower edge of the side sills to the arm rest. The roof is of the Brill plain-arch type, strengthened with concealed steel rafters 5/8 in. thick. Twelve Brill Exhaust ventilators are installed in the car.

The 57-ft. car also is a combination passenger, smoking and baggage car mounted on Brill 27 M. C. B. trucks. The doors in the baggage compartment of this car are arranged to slide and to uncover an opening of 42 in. In the rear bulkhead of the car there is a single sliding door and in the partitions separating the smoking from the main passenger compartment and also in the partitions separating the baggage compartment from the smoking compartment there is a single swing door. In the rear vestibule there is installed on each side single swing doors. At each end of the car in the center there is provided a swinging train door which permits passage from car to car, thus facilitating the use of this car for train service.

The underframe of the car is of all-steel construction, the side sills of 6-in. channel, the two center and intermediate sills of 6-in. I-beams and all center cross sills of 6-in. channel.

In the body framing of the car the corner posts are 4 in., the side posts 2¼ in. and the double posts built up to 8 in., all of ash. The outside sheathing of the car is of sheet steel. The roof is of the Brill plain arch type strengthened with concealed steel rafters 5/8 in. thick. Sixteen Brill Exhaust ventilators are installed in the roof.

PREPAYMENT CARS FOR SCHUYLKILL RAILWAY

BRILL 77-E TRUCKS

THE Schuylkill Railway Company, of Girardville, Pa., has received from The J. G. Brill Company four 41-ft. prepayment vestibule motor cars for use on its lines, which connect Mahanoy City, Shenandoah, Girardville and Ashland. The cars are mounted on Brill 77-E trucks, with 33-in. wheels and a 6-ft. wheelbase. In this truck the Brill solid-forged side frames play an important part. Having no truss framing enables the spring links to be placed at

wide apart points. Superior riding qualities are assured by reason of the combination of plate and coil bolster springs which graduate the spring action for light and heavy loads. Thus the bolster coil springs automatically are put into action under light loads. This arrangement, which is known as the Brill Graduated Spring System, has proven its entire practicability and is a standard feature.

On each side of the cars there are placed twelve windows, the win-



SCHUYLKILL RAILWAY CARS. The lower sashes raise their full height and the upper sashes are stationary, and framed continuously

dow heads straight and the windows provided with double sash, the lower sash raising and the upper sash stationary and continuous the full length of the carbody.

The platforms of the cars are 5 ft. 6 in. in length and are enclosed with stationary round-end vestibules sheathed on the outside below the windows and on the inside of the vestibules with sheet steel. Each of the vestibule fronts is provided with three windows with sash

are of 5 by $3\frac{1}{2}$ by 5-16-in. angles with the long leg turned horizontal. At the bolster the side sill is reinforced with a 6 by $3\frac{1}{2}$ by 5-16 by 30-in. angle to relieve the strain on the horizontal leg of the side sill. The end sills are of 3-16-in. pressed steel and the crossings of $\frac{1}{8}$ -in. pressed steel riveted to the side sills. The trap door supports are of $2\frac{3}{4}$ by $1\frac{3}{4}$ by $\frac{3}{4}$ -in. pressed steel. Intermediate floor supports are made of $1\frac{1}{2}$ by $1\frac{1}{4}$ by 3-16-in.

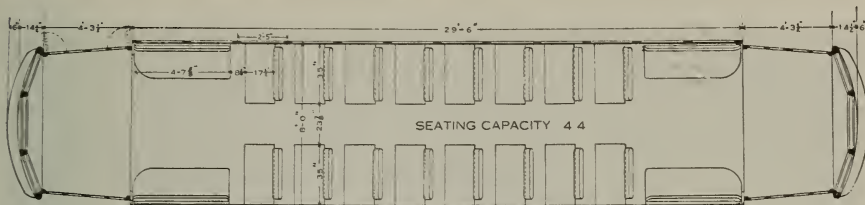


SCHUYLKILL RAILWAY CARS. Four prepayment vestibule motor cars of this type have been built for the Schuylkill Railway Company, of Girardville, Pa. They are mounted on Brill 77-E Trucks, in the design of which the Brill Graduated Spring System plays an important part

arranged to drop, the center sash provided with a rack to adjust it at any desired height. The platform openings are enclosed with a four-part folding door in two sections, one section folding out against the body corner posts and the other section folding out against the vestibule corner posts. The doors are operated in unison with the folding steps, control levers for the mechanism being located at the motorman's station.

In the underframe the side sills

angle. The bolsters are of cast steel, fastened to the side sills with turned bolts and perforated to allow for the passage of brake rods, cables, etc. The outside platform knees are made up of 7 by $3\frac{1}{2}$ by $\frac{1}{2}$ -in. angle reinforced with 2 by 2 by $\frac{3}{8}$ -in. angle iron under the end sill, and the center platform knees are made of 4-in., 5.25-lb. channel extending from end sill to bumper channel. In the laying of the floor there was provided a ramp of $2\frac{7}{8}$ in. from the end sill



SCHUYLKILL RAILWAY CARS. Height from track to underside of side sills, $35\frac{1}{8}$ in.; height from underside of side sills over trolley boards, 9 ft. $1\frac{1}{8}$ in.; height from floor to center of headlining, 7 ft. $11\frac{1}{4}$ in.; track to step, $13\frac{3}{8}$ in.; step to platform, $13\frac{1}{2}$ in.; platform to floor, $10\frac{5}{16}$ in.; weight of carbody less electrical equipment, 17,462 lb.; weight of electrical equipment, 1558 lb.; weight of airbrake equipment, 820 lb.; weight of trucks, 12,000 lb.; weight of motors, 7080 lb.; total weight, 38,920 lb.

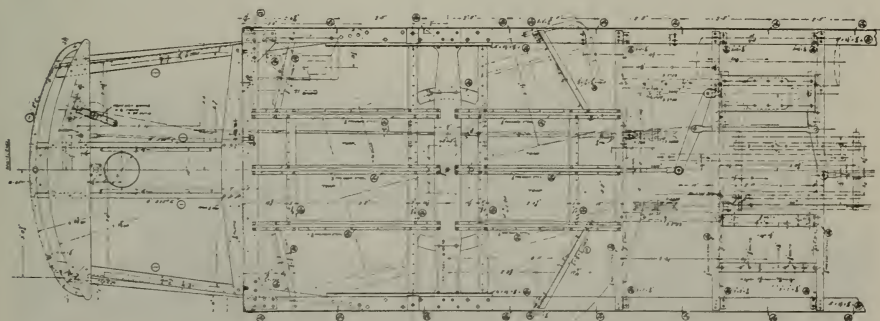
to a point 4 ft. in from the end sill. The aisles of the cars are provided with maple floor mat strips, allowance for sweeping being made at each end. The roof is of the Brill plain arch type, strengthened in the usual manner with concealed steel rafters with a foot at each end bolted to the top rails.

At each end of the car there is a 6-in., 8-lb. channel bumper extending the full width of the vestibule and projecting 6 in. from the face of the vestibule at each end. Also, each end of the cars is provided with a bumper shield of steel.

In the body framing of the car side posts of $1\frac{1}{2}$ by 2 by 3-16 and $\frac{1}{4}$ -in. tees extend from the side sill to the top rail, to both of which

they are riveted. The body corner posts are of 3-32-in. steel extending from the sub tee post entirely around the corner and up to the side of the bulkhead opening. The belt rail is of 3 by $\frac{1}{2}$ -in. steel covered with pressed steel window capping, extending down $21\frac{1}{4}$ in. on the outside of the belt rail and taking the rivets which pass through the belt rail and side sheets. The letter board and the vestibule corner and center posts are of wood.

Other Brill specialties included in the cars are Brill "Dumpit" sandboxes, Brill "Dedenda" platform gongs, Brill patented conductor signal bells and Brill Winner seats.



SCHUYLKILL RAILWAY CARS. The all-steel underframes of the cars give them the necessary strength without adding to their weight, the carbody without electrical equipment weighing 17,462 lb.

BAGGAGE CAR AND LINE CAR FOR NORTHERN OHIO TRACTION

COMPOSITE UNDERFRAMES



end baggage car and one 40-ft. double-end line car. The company, which is the result of a consolidation of the Canton-Akron Railway Company, the Canton-New Philadelphia Railway Company and the Tuscarawas Traction Company, and which also owns the entire capital stock of the Akron, Wadsworth & Western Traction Company, serves Akron, Canton, New Phila-

THE Northern Ohio Traction & Light Company, of Akron, Ohio, has purchased from the G. C. Kuhlman Car Company, of Cleveland, Ohio, one 60-ft. single-

delphia, Wadsworth, Ravenna and Barberton.

The baggage car is provided with 7-ft. sliding doors, two to each side of the car and located near the



NORTHERN OHIO CARS. Sliding doors seven feet in width make loading and unloading of bulky baggage and express matter comparatively easy



NORTHERN OHIO CARS. The underframe is built up for the most part of structural steel shapes, wooden fillers being used also. The principal dimensions are: Length over corner posts, 49 ft. 8 in.; length over platform, 58 ft. 5½ in.; length of baggage compartment, 55 ft.; width over sills, including sheathing, 8 ft. 6 in.; height from track to underside of side sills, 41½ in.; height from underside of side sills over trolley boards, 13 ft. 3¼ in.; weight of carbody with electrical equipment, 34,000 lb.; weight of trucks with two motors each, 36,400 lb.; total weight, 70,400 lb.

ends. These doors slide inside of the car, being protected in their open position by wooden framing made of slats extending from the floor to the ceiling of the car to guard against baggage being piled against or falling against the glass in the doors. On the outside of the cars, at each side of these doors, the sheathing is protected by 18-in. metal plates, taking off the jambs the wear caused by the throwing of baggage and other heavy things into the car. Each door is also provided with a stirrup step. At each of the extreme corners of the car

there is a 30-in. door for use by the motorman, or any other trainman. The rear end of the car is formed of three sections. The middle section, a 30-in. door, is hinged to one of the side sections and thus may be opened alone. The outside sections are hinged to either side of the car, thus making it possible to swing them open and to throw the whole end of the car open so as to facilitate the loading or unloading of bulky baggage or express matter. The front end of the car conforms to the rear end in shape, the three sash, however, being stationary.



NORTHERN OHIO CARS. The line car is shown with the revolving platform in its raised position. The roof platform also is shown, and the space left along the side of the car by moving the side wall back 18 inches is also shown. This space makes it possible to load poles, rails, etc., on the side of the car, holding them in place by means of stakes which fit into the stake pockets

Inside, fastened to the roof rafters, there are two longitudinal rails fitted, at equidistant points, with pockets for wooden uprights extending from the floor to the rafters and intended for the stacking of baggage and express matter. Also there are provided four crossings fitted with wrought iron pockets to take the top ends of other uprights extending also from the floor to the crossbar. The lower end of these upright bars is provided with a strap bolt which passes through the floor. This makes it possible to fit the car up so that baggage may be piled in any particular part of it, stacked up against these upright bars.

In the underframe of the car side sills of 9-in. channel are used, placed between a $2\frac{1}{2}$ by 9-in. yellow pine sill on the outside and a

4 by 4-in. yellow pine sill on the inside. Two center sills running the full length of the car are made of 9-in. I-beams and three intermediate sills of 4 by 4-in. yellow pine, resting on angle crossmembers. The end sills are of 4 by 4 by $\frac{3}{8}$ -in. angle connected with the side and intermediate sills by gusset plates. At the ends of the car between the bolsters and the end sills and at the center there is used diagonal bracing connected to the side and center sills by gusset plates. The bolsters are made up of 9-in. channels and $1\frac{1}{4}$ by 10-in. bottom plates, and body truss rods $1\frac{5}{8}$ -in. in diameter are anchored at a point close to the bolster, being provided with a $1\frac{3}{4}$ -in. turnbuckle in the center.

In the line car one side wall is set back 18 inches, the underframe

projecting that far beyond the side of the car and thus making a place for loading poles, rails and other long material which would be inconvenient or impossible to load in the interior of the car. Stake sockets placed on the extreme edge of the underframe take upright stakes and thus prevent the poles, etc., from rolling or sliding off.

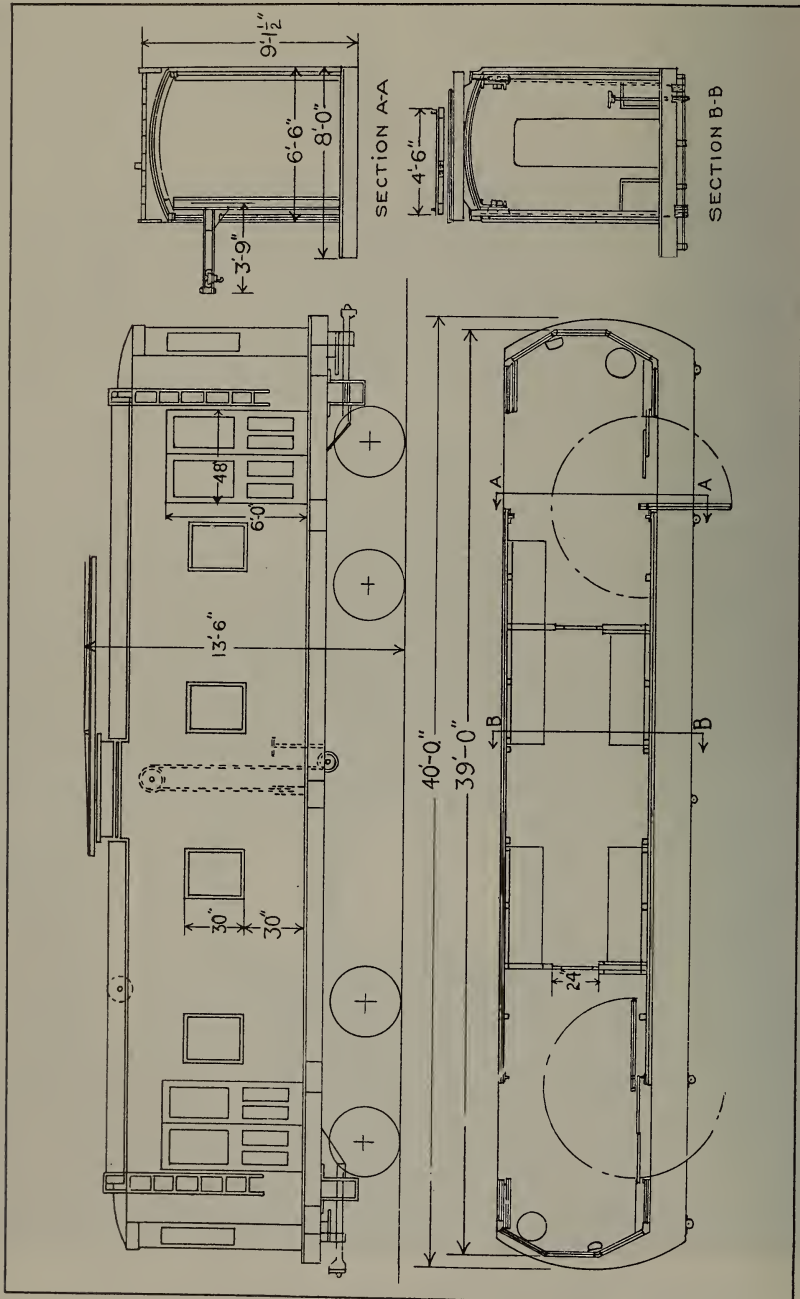
The roof of the car consists of ten rafters of $1\frac{3}{4}$ by 3-in. ash, each reinforced with steel carlines, $\frac{3}{8}$ by $2\frac{1}{2}$ in., the legs of the carlines bolted through the top plates. A revolving platform 14 ft. long, constructed with two $\frac{1}{2}$ -in. rods

anchored at each end through the angle-iron seat and having a railing 21 in. high, is fastened to a movable frame work by means of steel center bearings, and the whole platform revolves on a steel bearing ring, approximately 7 ft. 2 in. in diameter.

At each side door, on the working side of the car only, there is provided a crane built into the car and of sufficient strength to carry a two-ton hoist, the cranes being built of 6-in. channels placed back to back and connected with suitable steel castings and gusset plates. The arm is of the proper length to



NORTHERN OHIO CARS. At the left of the photo is shown the crane, which is arranged to swing out through the sliding side door and project over the adjoining track



NORTHERN OHIO CARS. Height from track to underside of side sills, 3 ft. 4 in.; height from underside of side sills over revolving platform, 13 ft. 6 in.; weight of carbody, including electrical equipment except motors, and with air-brakes, 28,040 lb.; weight of trucks, 27,560 lb.; total weight, 55,600 lb.



NORTHERN OHIO CARS. The framing at each side of the car encloses the wire ropes used for hoisting the platform on the roof. The wheel used in this connection is also shown

pass through the doorway. The cranes are held in position by means of pivot castings at the top and bottom and tied across the car by means of a $\frac{3}{8}$ by 3-in. steel plate to two angle iron uprights, which are attached to the opposite side frame of the car.

Each side of the car has two double sliding doors sliding toward the ends of the car and protected by means of a slat pocket. These doors are also provided with wire netting fastened to the door stiles and rails to prevent the breaking of the glass. Four covered bins are provided in the interior of the car

for the storing of tools, accessories and material for repairs.

In the underframe of the car the side sills are of 8-in. I-beams in one piece and the center sills are of the same dimension. Each bolster is built up of 8-in. channels running continuously across the car and intersecting the center sill I-beams. The end sills are of 7 by $3\frac{1}{2}$ by $\frac{1}{2}$ -in. angles bent to form and riveted to the side and center sills. The diagonals and intermediate sills are of 3 by 3 by $\frac{3}{8}$ -in. angles. On the outside of the side sills there are provided $4\frac{1}{2}$ by 8-in. yellow pine fillers.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

HOW'S YOUR WISHBONE?

DO you, Mr. Motorman—or you, Mr. Conductor—belong to that peculiar, indefinite, rather spineless class of man who is continually wishing? You know the type—the man who sees someone else making a success in life, or something he would like to have, and, instead of setting the wheels of his brain machinery in motion to grind out the desired result, simply sits on the middle of his back and wishes? Haven't you heard his incessant wail, "Oh, I wish I could do this or that," or "How I wish I had enough money for this or that thing?" What is the inevitable accompaniment of this "wishing" habit? Is it ambition and push—real get-up-and-do ginger? No; it's a fireless, spunkless habit of sitting still and coveting something against which laziness forms an impassable bar. There is nothing new under the sun and, no matter what the position in life of a man, no matter how far down the scale he may be, to climb to any particular objective point he has but to follow the path hewn out for him by someone who has gone before. There is a path for everyone, from any point to any point, and the only toll you must pay on these highways to success is a little expenditure of effort. There are scores of ways for the platform man to improve himself. If night school is impracticable—and it should be to but a very few—there are numerous helpful hobbies that may be ridden, little pleasure-making pastimes that bring in extra dollars and the keenest enjoyment. The man who has a pet diversion upon which to rely for pleasure in the evenings is the man whose brain will react better and who will go to his barn in the morning for his run in better shape to take his car out than he would have been had he sat slumped down in his easy chair nodding over his paper the evening before. The really big men of life have all been men who had good hobbies to ride and who tuned up their brains bit by bit the same as a piece of machinery is tuned up. However, those big men fortunately possessed, along with their wishbone, a large-sized backbone.

You have heard the old saying, "You may lead the horse to water, but you cannot make him drink," haven't you? The same is true all the way through life and back again. Some one may devote his thought and effort to prod you along up the path to success, jolting you from behind here and yanking you up a step from in front there; but, after all, you're the one who will have to do the thinking and to get that brain trained for intensive thinking is the greatest asset you possibly could have.

FIRST AID ALPHABET

- A** is for ACCIDENT — they should be rare;
B is for BRAKE — apply it with care;
C is for COURTESY — have it “to burn”;
D is for DANGER — stop! look! listen! learn;
E is for EFFORT — an excellent thing;
F is for FRIENDS — that effort will bring.
G is for GONG — which must be employed;
H is for HURRY — we try to avoid;
I is for INJURY — which accidents bring;
J is for JOB — to keep it’s the thing;
K is for KING — a man with a heart;
L is for LOVE — if we men do our part;
M is for MERIT — which brings extra pay;
N is for NICKELS — we take in each day;
O is for OXYGEN — that means fresh air;
P is the PUBLIC — we strive to take care;
Q is for QUARTER — six tickets it buys;
R is for REST — which all of us prize;
S is for SIGNAL — to “stop” or to “go”;
T is for TRAFFIC — where we must run slow;
U is for US — from the President down;
V for our VETERANS — men of renown;
W is for WATCH — any danger to see;
X is for EXCELLENCE — minus the E;
Y is for YES, SIR! — which is pleasant to hear;
Z is for ZEAL — throughout the year;

L. W. GLAZEBROOK, Chief Surgeon, Wash. Ry. & Elec. Co.

There are lots of men who have been pushed into a musty corner early in life, there to stick for the rest of their days with a growl ever on their lips about the advantages they didn't have, the things they missed that other people got and the general hard luck that placed them on the shelf. Don't believe it, there's nothing to it. Those fellows simply didn't have the ambition, the “old pep” necessary to success. They stayed in the hole they were cut to fit because they didn't have enough spunk to drag themselves out of that hole and change their shape

SPARE-TIME READING

THERE are many ways in which a motorman or conductor can devote his spare time, or a part of it at least, to reading which will do him a great deal of good. From his master mechanic or his superintendent he can usually borrow copies of the magazines which are devoted exclusively to the electric railway field. These magazines, carefully read, will make a man more interested in his work. To read in the *Electric Railway Journal*, *Electric Traction* and other magazines, how other railways are operated, cannot fail to make platform men more thoughtful and useful and inspire the ambitious ones to greater and better informed efforts.

Avoid debt as you would a serpent. The man who buys things on charge accounts and trusts to Providence to enable him to skimp enough out of his next pay envelope to meet his debt is worse than the fellow who plays the races, or the stock market fiend. The latter in most cases can better afford his losses than can the workingman who lets the bright lights of the stores run away with his good judgment. Solid cash from start to finish is safest and easiest, because we can always go without something, no matter how badly we think we need it.

BRILL ADVERTISING

AS a result of the tendency of the electric railway field toward the light-weight, single-truck cars with their economy of operation and their many other undeniable advantages, the Publicity Department has been conducting for some time a series of advertisements on this subject. In the *Electric Railway Journal* there appears every week, on the inside of the back cover page, a full-page advertisement of one of the latest types of single-truck cars, illustrated with a pen or wash drawing, showing the car in operation, and new copy is prepared for each issue. These advertisements have been appearing for the last five months, and will be continued for a month or two. In *Electric Traction*, and the *Street Railway Bulletin* there appears in every issue, on the back cover page, a full-page advertisement showing some of the most popular of Brill types of cars and trucks grouped on attractively designed and lettered backgrounds.

CHANGES OF ADDRESS

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



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Main Office

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London Office: 110 Cannon Street, E. C.

CABLE ADDRESS: "AXLES," LONDON

AMERICAN CAR COMPANY, ST. LOUIS, MO.

G.C. KUHLMAN CAR CO., CLEVELAND, OHIO

JOHN STEPHENSON CO., ELIZABETH, N. J.

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CIE. J. G. BRILL, 49 RUE DES MATHURINS, PARIS

CABLE ADDRESS: "BOGIBRIL"

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ARGENTINE AND URUGUAY—C. S. Clarke & Co., Calle Bartolome Mitre 478, Buenos Aires

NATAL, TRANSVAAL AND ORANGE RIVER COLONY—Thomas Barlow & Sons, Durban, Natal

ITALY—Giovanni Checchetti, Piazza Sicilia 1, Milan

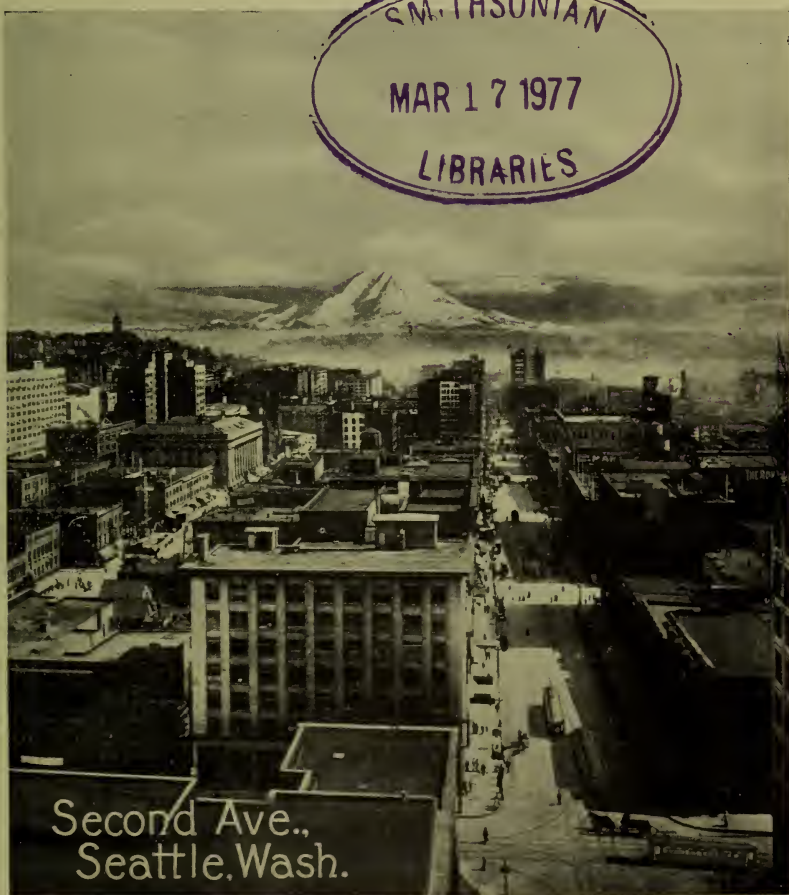


THE "Radiax" Truck has made single-truck cars feasible in a great number of cases where existing conditions demanded a larger car than could be mounted on the average single truck. The wheelbase of the "Radiax" is such as to permit its use under cars with seating capacities almost as large as that of the average double-truck car. This length—which well might be called abnormal—has been made possible by the long links of the truck, allowing a large amount of radial motion in taking curves and at the same time exerting a powerful force tending to return the wheels to their normal position. This force, of course, pulls the wheels back into position when passing over irregularities of the track as well as when the truck is leaving a curve. Two pins at the lower end of the links engage in grooves and when the link is inclined at the slightest degree from its upright position one or the other of the pins comes out of its groove and the force tending to pull the truck back to its normal position immediately is set up. Being a Brill truck, solid-forged side frames, of course, form one of the most important features of the "Radiax."

THE J. G. BRILL COMPANY, PHILADELPHIA

BRILL MAGAZINE

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BRILL

SUPPLIES AND SPECIALTIES

RAILWAY managers who are planning to rehabilitate their rolling stock so as to have their equipment in first-class order for summer service will find that Brill Supplies and Specialties include everything they need and that, being Brill products, these supplies and specialties are first in quality and show it in their handsome appearance. The Brill line embraces the following:

Brill Curtains of any material, for open or closed cars.

Platform Steps and Step Hangers for all types.
Platform Gates for open-platform cars.

Angle-iron Bumpers and Bumper Shields for any type car.

Round-corner Seat-end Panels and Running-board Hangers for open cars.

"Dedenda" Alarm Gongs and "Retriever" Signal Bells, the best on the market.

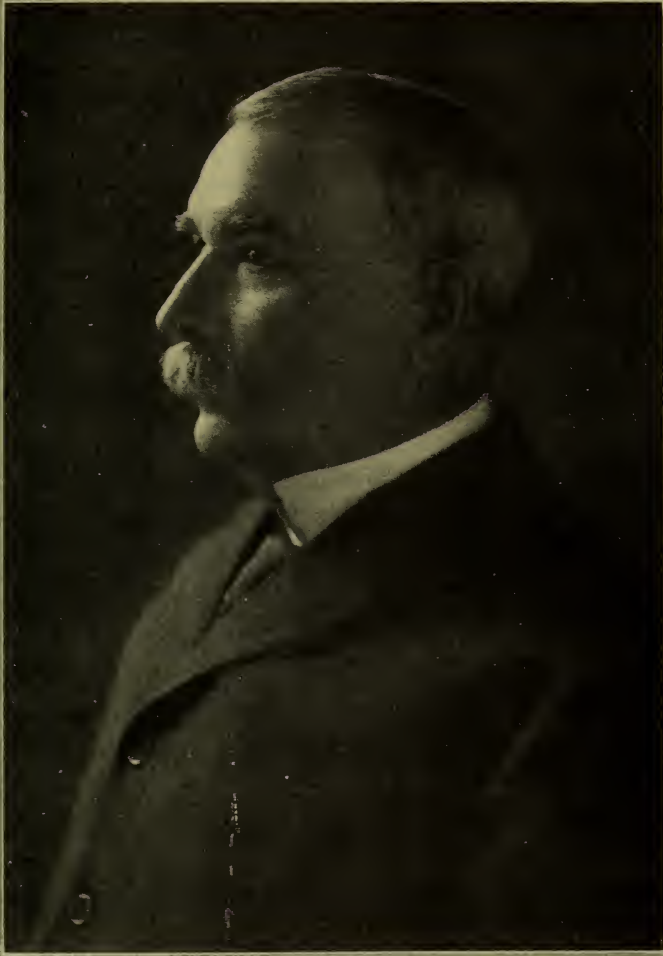
"Half-Ball" Brake Hangers, Drawbars, Grab Handles, Ratchet Brake Handles.

Wide-wing Journal Boxes for 21-E Trucks.

Graduated Spring Device for 27-G Trucks.

Swing-link Journal Boxes for 21-E Trucks.

SEND FOR BRILL ORDER GUIDES
FOR CAR AND TRUCK PARTS



J. J. Sullivan

I believe firmly in the tremendous advantage to a man of being truthful and industrious and I am a great believer in perseverance and in the good results which are the inevitable outcome of perseverance applied along proper lines.

I believe in upright living and in downright honesty. The man who is truthful, honest and industrious is going to win—he is bound to win. His truthfulness, his honesty and his industry guarantee to him success.

There is nothing in the world that is to me so interesting, so gripping, as the study of character—the analysis of a man's attributes. Perhaps the chief of these attributes is loyalty. Be loyal always to your interests and to your friends. Be loyal to your ideals, your principles, and be loyal to your state and to the city in which you live.

JEREMIAH J. SULLIVAN.

FEBRUARY 15, 1916

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JEREMIAH J. SULLIVAN

JEREMIAH J. SULLIVAN was born in the south of Ireland, January 5, 1838. His early education was received in Ireland, and as a young boy he came to America, where his family located in Philadelphia. Here he continued his education and in 1859 received his diploma from the Crittenden College, having completed a business course. On January 1, 1866, Mr. Sullivan went into the wholesale dry goods business with his brother, James F. Sullivan. The business enjoyed rapid and remarkable success. In 1872 Mr. Sullivan became interested in the Frankford & Southwark Passenger Railway, Philadelphia, operating on Fifth and Sixth Streets. In 1881 he was made a Director, and in 1884 refused the presidency, which office he later accepted, however, on January 9, 1889. Since that time he has been re-elected to the office for twenty-eight consecutive years. In 1890 he bought for cash the Lehigh Avenue Passenger Railway. In 1891 this company merged with the Lombard & South Streets Railway, and in 1892 he leased the Citizens Passenger Railway and the Second & Third Streets Railway. Trolley franchises were granted in 1893 to nearly all the companies, and in order to get capital it was necessary to organize a new company. The Fifth & Sixth Streets line, the Second & Third Streets line, and the Tenth & Eleventh Streets line were leased to the new company, which was called the Electric Traction Company.

In 1895 the Electric Traction, Philadelphia Traction and Peoples Traction Companies were leased to the Union Traction Company, which was organized in that year. The American Railways Company was formed in 1898 and Mr. Sullivan was made a Director. In February, 1902, he was elected President, which office he held until December 31, 1915, when he resigned. He is still President of the Union Traction Company of Philadelphia, a Director of the Philadelphia Electric Company, President of the Frankford & Southwark Passenger Railway, Director Philadelphia Rapid Transit Company, President Scranton Railway Company, Director Peoples Traction Company of Philadelphia, President Altoona & Logan Valley Railway Company and of the Bridgeton & Millville Traction Company. Mr. Sullivan also holds office with many other electric railways and lighting companies throughout the country. He is also Vice-President of the Continental Equitable Trust Company of Philadelphia. He recently resigned from the presidency of the Chicago & Joliet Electric Railway, which position he held for a number of years.

INTERURBAN CENTERS AND INTERURBAN CARS

SEATTLE



SEATTLE, chief city of the state of Washington and northernmost of the big western cities of the United States—not more than 200 miles from the

Canadian boundary—has a geographical situation as interesting as its development has been remarkable, the latter being dependent in many ways upon the former. The city is located on the eastern shore of Puget Sound, that great arm of the Pacific Ocean which cuts its way into the state of Washington and carries with it great opportunities for ocean trading, since it is of sufficient depth to float the world's largest vessels. Through Elliott Bay, which deeply indents the city on the west, Seattle has a direct route to the Pacific Ocean through the Sound. Perhaps it is because the largest steamships, plying to the Philippines, Australasia, Alaska, China, Japan, Mexico, South America and other places, regularly call at Seattle that the largest railroads of the Pacific Northwest have been drawn to the city, or perhaps it was because Seattle developed into such an important railway center that the steamships were drawn there to carry away over the seas the product for shipment thrown into

the city by the many large railways. Whichever may have been the definite mode of the city's progress, it is certain that Seattle ranks high as an inland seaport, a classification which makes its situation unusual, the city lying about 130 miles directly inland from the Pacific Ocean. That Seattle has an ideally perfect harbor protection is apparent at first glance.

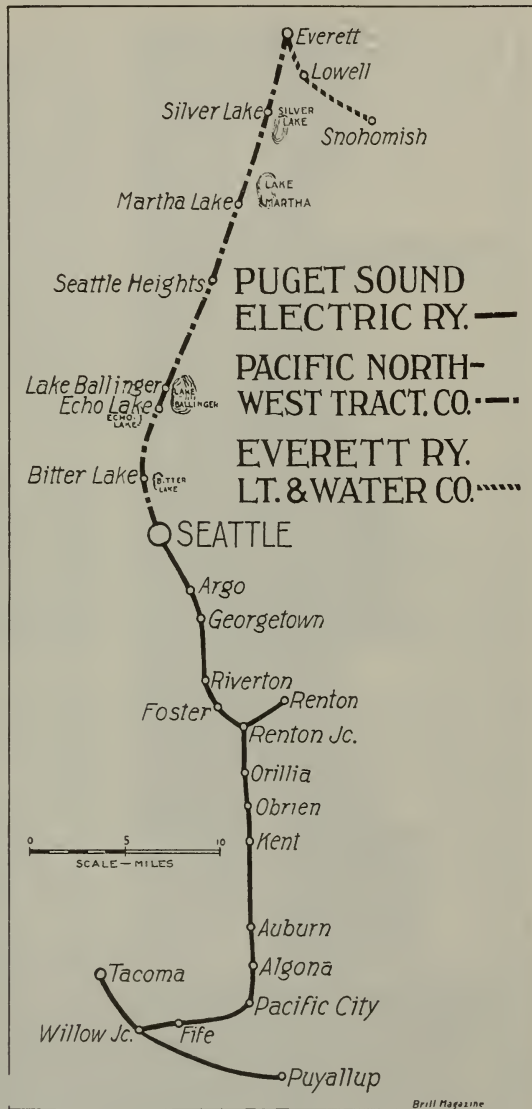
One of the greatest stimulants the city has had is the climate with which it is endowed. The chill Arctic currents are counteracted by the balmy, temperate Japan current and the climate of the whole sound is very similar to that of southern England, being moist and equable, summer gently fading into winter and winter blossoming into summer. The summer season is known as the dry season and the winter season as the wet, and no extreme weather is experienced at any time of the year. The city lies in the trough of the long valley between the Coast and the Cascade ranges of the Rocky Mountains. Thus it is protected from the east, the protection, however, not being an impassable one, as there are within reach a number of easy mountain passes. Owing to the mildness of the climate, out-of-doors work is possible on practically every day of the year. Malaria is unknown, and for many years the death rate per thousand has not been in excess of 9.25. The

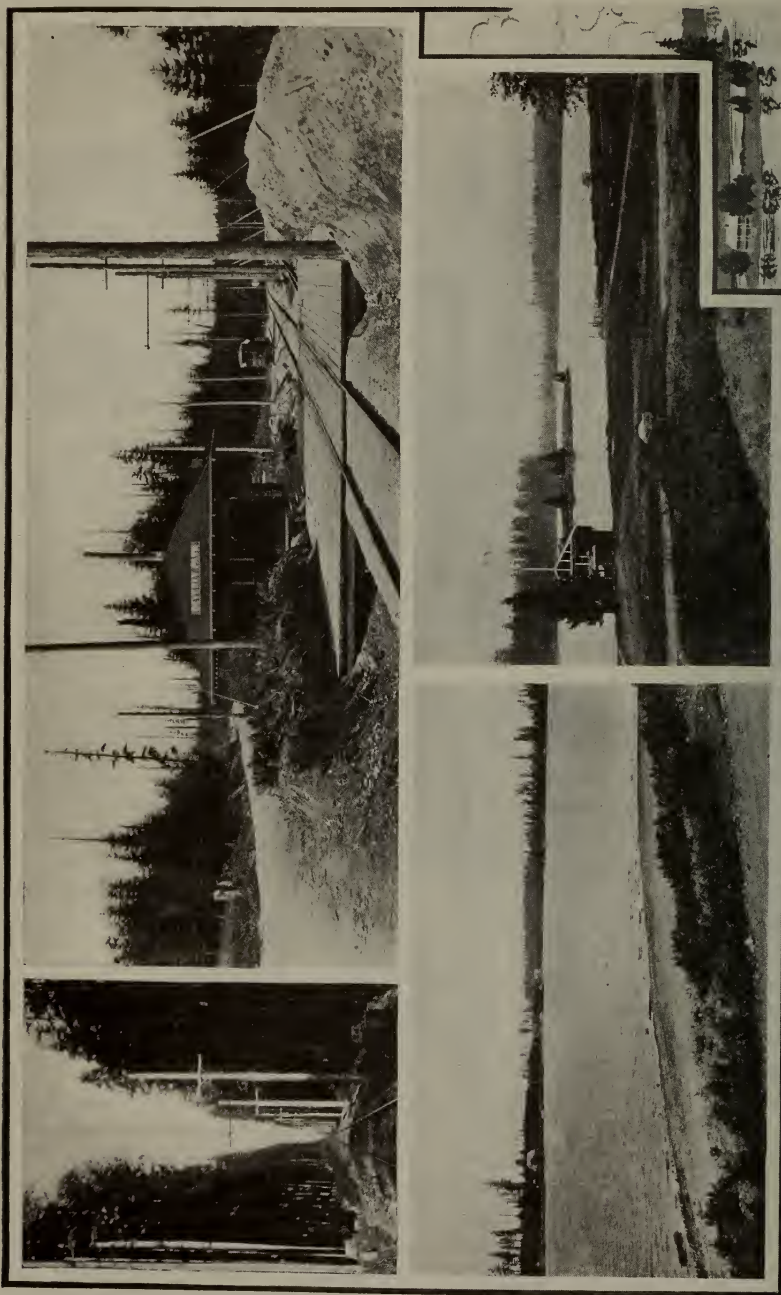
city averages between 300 and 500 feet above the level of the sea.

Seattle has grown in a way that is typical of western progress. In 1900 it had a population of 80,000; in 1910 this population had grown to 237,000, and the city is still growing and spreading both in territory and population. The first railroad came in 1884 and progress immediately was noticeable. In 1889, however, fire destroyed the entire community and right on top of the fire came the panic of 1893, during which period the growth of the city was at a standstill, as was the case with so many other American cities. The Alaskan gold rush of 1897 acted as a stimulus, however, and the lost ground was quickly recovered and the city began again to shoot ahead. Alaska soon came to depend upon Seattle for food and food products, and this acted as a boom for the city as a seaport as well as a stimulant to its manufacturing.

On the heels of the Alaskan gold rush came industry after industry, springing up almost overnight, so that the city almost immediately became one of the business centers of the northwest. As a direct result of the gold rush

Seattle took almost the entire Alaskan trade and handled the greatest part of the shipments of gold. Its commerce grew commensurately, and before long the output of the factories of the city was





PACIFIC NORTHWEST TRACTION COMPANY

Forest canyon on line
Silver Lake, six miles from Everett

Beverly Park Station, four miles south of Everett
Lake Ballinger, thirteen miles from Seattle

going ahead by leaps and bounds. Flour, packed meats, slaughter-house products, malt liquors, foundry and machine-shop products, lumber and timber, prepared fish, ships and boats form the principal products of the city's manufacturing. Ships of any size may be built at Seattle, the U. S. battleship *Nebraska* having been constructed at a local shipyard. Seattle's power facilities are good, Snoqualmie Falls, to the northeast of the city, Puyallup River, to the southwest, and Cedar River forming the principal sources.

The city is geographically interesting. It covers a long stretch of rolling territory lying between Puget Sound and Lake Washington, being deeply indented on the west by Elliott Bay, which gives the city somewhat the shape of an hour-glass. This bay constitutes a harbor of remarkable safety of some four miles in length and two miles in width. The waters of Puget Sound connect with the Pacific Ocean through the straits of Juan de Fuca, making the distance from San Francisco by water about 800 miles. The eastern boundary of the city is formed by Lake Washington, a body of fresh water some twenty-two miles in length and varying from two to four miles in width. A large part of the western shore of this lake belongs to the park department of the city and is being

developed and beautified as a pleasure ground. Lake Union, lying in the center of the city, is a fresh-water lake, somewhat in the shape of the letter Y, and Green Lake, in the north-central part, is about a mile in length and about one-third of a mile in width.

A canal built by the U. S. government runs from the mouth of Salmon Bay into and through Lake Union and into Lake Washington. By means of a lock at the mouth of Salmon Bay the waters of that bay, Lake Union and Lake Washington are maintained at a uniform level of eight feet above mean high tide. The city's parks are worthy of special notice, more than \$300,000 being spent annually for maintenance and development. Also there are many miles of well-kept boulevards.

The territory surrounding Seattle is rich in natural resources, including coal, lumber, clay, fishing, mining and good facilities for agriculture. Through this surrounding territory, connecting it with Seattle and extending north to Everett and south to Tacoma,



INTERURBAN CENTERS AND CARS. Freight motor of the Seattle-*Everett* interurban hauling an excursion train—Pacific Northwestern lines



INTERURBAN CENTERS AND CARS. Interurban passenger station at Everett

there run two interurban lines whose operation is interesting. These lines are the Puget Sound Electric Railway, running to Tacoma, and the Pacific Northwest Traction Company, running to Everett, both of which companies are controlled by the Puget Sound Traction, Light & Power Company.

In 1912 the Puget Sound Traction, Light & Power Company,

which is under the management of the Stone & Webster Management Association, purchased and consolidated the properties of the Seattle Electric Company, Pacific Coast Power Company, Puget Sound Power Company, Seattle-Tacoma Power Company and Whatcom County Railway & Light Company. It also purchased most of the capital stock of the Puget

Sound Electric Company and all of the capital stock of the Pacific Northwest Traction Company, which in turn owns the stock of the Puget Sound International Railway & Power Company—lessee of the Everett Railway, Light & Water Company. The company through ownership or control does substantially all the electric street and interurban railway and the



INTERURBAN CENTERS AND CARS. Interior of car shown on page 39

greater part of the commercial lighting and power business in the Puget Sound district, including the cities of Seattle, Tacoma, Bellingham and Everett.

Construction of the interurban line between Seattle and Everett was begun in 1903, the original company being the Seattle-Everett Interurban Railway. The line was extended slowly until 1908, when full transfer was made to the Stone & Webster Company and the name of the company was changed to the Puget Sound International Railway & Power Company. This name was early supplanted by that of the Seattle-Everett Traction Company, and in 1910 the line was pushed through to Everett and the old part of the line largely rebuilt.



INTERURBAN CENTERS AND CARS. End view of Seattle-Everett interurban passenger car

In 1912 the name of the operating company was changed to the Pacific Northwest Traction Company, traffic arrangements having been made in the meantime with the Seattle Electric Company for entry over the city tracks of that company to a more central point in Seattle. That arrangement still is in operation, the Seattle Electric



INTERURBAN CENTERS AND CARS. Seattle-Everett interurban passenger car



INTERURBAN CENTERS AND CARS. Sub-station at Hall's Lake,
Pacific Northwest Traction Company

Company having been absorbed however by the Puget Sound Traction, Light & Power Company. By a similar arrangement with the Everett Railway, Light & Water Company entrance is made into the city of Everett. Through inter-urban service between Seattle and Everett, therefore, is furnished by the three companies.

Between Seattle and Everett there is but one town of any importance—Edmonds, a town of 1,000—which, however, is located about three miles from the line of the company and is reached by means of autobus service. The rural communities adjacent to the line furnish a total tributary population of about 4,500. Everett, the fourth largest city in the state, has a population of about 35,000 and is known as the City of Smokestacks. It produces a large amount of lumber and shingles annually. The city has other large manufacturing interests, among these being three large fish canneries and a large paper mill. At Everett the line makes connection

with the Everett-Snohomish Interurban, which is owned by the Everett Railway, Light & Water Company and operated by the Puget Sound International Railway & Power Company. The population of Snohomish is about 3,500 and the rural population along the line is about 1,000. At Snohomish

connection is made with a bus line operated between Snohomish and Monroe. The latter is a prosperous community of about 1,500, which is supported by a good agricultural district. The residents of both of these towns are, therefore, as a result of convenient connections, patrons of the Everett-Seattle line.

All types of steam railroad freight cars are handled on the line, connection being made with the Great Northern Railway Company and the Northern Pacific Railway Company at Ballard over the tracks of the Western Washington Power Company and at Lowell, a suburb of Everett, with the Great Northern Railway and the Chicago, Milwaukee & St. Paul Railway Company over the tracks of the Everett Railway, Light & Water Company.

For the operation of its equipment the company purchases its power from the Puget Sound Traction, Light & Power Company and the Puget Sound International Railway & Power Company. The



PUGET SOUND ELECTRIC RAILWAY

Interurban limited train in Tacoma

Station of company at Kent

Tacoma interurban station



INTERURBAN CENTERS AND CARS. Typical scene along tracks of Puget Sound Electric Railway

current is transmitted to the company's sub-stations at Hall's Lake or Cedar Valley at 13,000 volts, and the line operating voltage is 600. The company has six passenger cars, all of which have a separate smoking compartment and one of which is a combination passenger, smoking and baggage car. The cars all measure 52 ft. over their bumpers, the width over sheathing being 8 ft. 10 in., the seating capacity 57 and the weight

of the cars and trucks fully equipped 78,000 lb. The cars are single-end, are built on composite underframes and have straight wood sheathing. They are equipped with multiple-unit control, but this method of operation is not used, the practice being to run the cars separately. The cars are also equipped with a storage battery auxiliary

lighting system, so that if the trolley pole is thrown from the wire the car is not plunged into darkness. This equipment has been found to meet with the favor of passengers.

General freight, both carload and less-carload, is carried on and a very considerable express business is transacted, this consisting of the transportation of small and moderate-sized packages on passenger cars. Both in and out of

the cities the cars collect their current through a trolley. The maximum speed is about fifty miles per hour, with the average number of stops about one to the mile. Outside of the cities the lines of the company are laid on private-right-of-way. In addition to the passenger car equipment the com-



INTERURBAN CENTERS AND CARS. 45-ton freight locomotive of Puget Sound Electric Railway

pany has one double-truck line car, mounted on Brill trucks, six box cars, twenty-four flat cars and two electric locomotives of the box car type.

The fares are collected by cash fare receipts and tickets, the latter being sold by the ticket agents only. During 1915 the number of passengers was 732,050 and the car mileage 563,441. The tons of freight carried totalled 62,083. The record of the company for the last five years shows a very creditable operation, the number of delays being remarkably small. There was a total of 89,438 trains run during this period, and the average amount of lateness for all trains run was 37.8 seconds. There have been no serious derailments, there have been no collisions between trains and there never has been a single passenger killed.

The Puget Sound Electric Railway runs from Seattle south to Tacoma, serving en route such towns as Kent, 2,250; Auburn, 1,700; Puyallup, 5,200; Renton, 2,850, and Milton, 600. Tacoma, with a population of more than 100,000, is third largest city in the state of Washington and is one of



INTERURBAN CENTERS AND CARS. Kent sub-station of the Puget Sound Electric Railway

the greatest commercial and industrial centers of the northwest. It, too, has a splendid harbor and its growth has been remarkably rapid. The abundant resources of the neighboring territory, together with a topography which furnishes easy access to the great continental railway systems which in the early days of its development recognized its advantages as a coastwise and ocean traffic port, have lent a great impetus to its progress. The principal industries are lumber, timber



INTERURBAN CENTERS AND CARS. Parlor car in use on standard limited trains of Puget Sound Electric Railway

and planing mill products, flour and grist mill products and smelting and refining. In addition the Puyallup Branch has a tributary population of 5,575 and the Renton Branch a population of 3,100. The trains of the company are operated in Seattle over the tracks of the Puget Sound Traction, Light & Power Company, and in Tacoma over the tracks of the Tacoma Railway & Power Company. At various points on the lines of the company there are freight connections with steam railroads.

For the operation of its lines the company purchases current from the Puget Sound Traction, Light & Power Company, the transmission voltage being 50,000, stepped down to a line voltage of 600. For the handling of this current sub-stations are located at Milton and at Kent.

The standard car in use on the company's lines measures 55 ft. over the vestibules, 9 ft. over the side sheathing, 34 ft. between centers of bolsters, has a seating capacity of 58, and a total weight

of 86,800 lb. for the trucks and car body fully equipped. The cars are built for single-end operation upon composite underframes and have straight sides of wood. They are operated in one-, two- or three-car trains. The company conducts a coal, brick and general freight business, and package express is taken care of by the passenger trains. In the cities and on the Puyallup Branch current is collected by trolley, and on the main line, which is laid on private right-of-way, the third rail is used. For normal operation the company uses thirteen cars, but has total of twenty-seven available for use. The maximum speed attained by the trains is sixty miles per hour, the average number of stops for local main line trains being 1.5 and for limited main line trains .7 stops per mile.

The traffic statistics of the company for the year 1914 show a total of 1,723,979 passengers carried, with a car mileage of 1,450,028 and 168,064 tons of freight.

No better way of spreading the Safety First idea could be devised than regularly and systematically to publish matter on the subject for the education either of the public or of the car crews or both. Whether the publication be a pamphlet, booklet, folder or magazine it would guarantee better results than those which could be obtained through intermittent, hit-or-miss campaigning by means of lectures, etc. Then, a sentence or two neatly worded and printed on a time table might work wonders.

TRAILERS AND MOTOR CARS FOR DETROIT UNITED

CENTER ENTRANCE NEW ON LINES

THE Detroit United Railway Company has received from the G. C. Kuhlman Car Company, of Cleveland, Ohio, twenty-five single-end motor cars which are very similar to equipment previously built for the company, and fifty center-entrance trailers, the latter being the first of the kind to be put into service by the company. Both of the cars, like the majority of the equipment in use

by the company, are adapted to P. A. Y. E. fare collection. They have been put into service on the busiest lines in the city, principally Woodward, Crosstown and Jefferson. The former is first being fully equipped with the new four-motor motor cars and trailers, which will release some of the two-motor, double-truck cars which have been in use on that line. This old equipment will be sent to some



DETROIT UNITED CARS. The combination of cross and longitudinal seats in this car is one of its best features. The longitudinal seats are placed at the ends of the car, where they serve to provide extra standing room where it is most needed and thereby relieve congestion



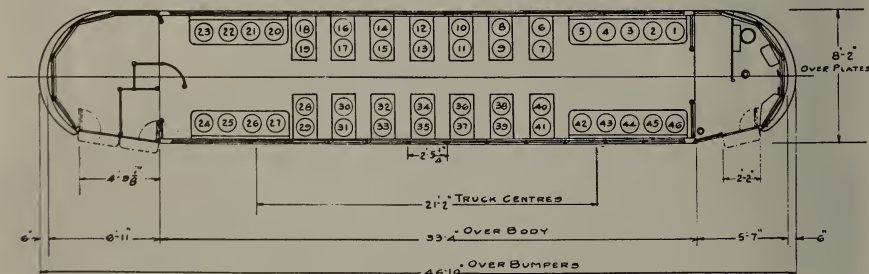
DETROIT UNITED CARS. The arrangement of the rear platform, which is known as the "Detroit platform," is one of the good features of these cars. The two folding doors at the rear serve as entrance and exit, the front door being an auxiliary exit. Pipe railings separate the conductor from his passengers and serve to keep the incoming and outgoing streams apart

lines throughout the city which have been operating with single-truck equipment.

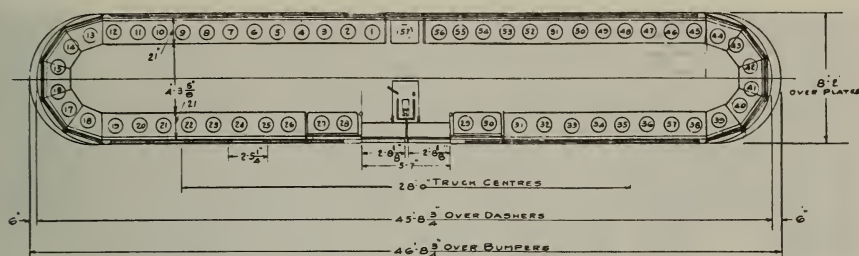
A duplicate order for twenty-five motor cars and fifty trailers has been entered by the company and these cars are in course of construction.

The operation of the company may any day be radically changed by the adoption of the skip-stop plan by the common council of the city. This would of course mean quickened schedules and perhaps a readjustment of the disposition of equipment. The operation of the company necessitates provision

being made for extra service at several points throughout the city's busiest section. For this reason the trailers were purchased so as to provide sufficient carrying capacity at the rush hour. The train—motor and trailer car—has a seating capacity of 103 passengers, the trailer being fitted with longitudinal seats which give the car a seating capacity of 57 persons. In addition, both cars are designed so that there is sufficient room for standing passengers, the wide aisle in the trailer car being very apparently a guarantee for that car and the combination of longi-



DETROIT UNITED CARS. Height from track to underside of side sills, 2 ft. 9 3/4 in.; height from underside of side sills over trolley boards, 9 ft. 3 1/4 in.; height from floor to center of headlining, 8 ft. 3 3/4 in.; track to step, 13 1/2 in.; step to platform, 13 in.; platform to floor, 11 3/4 in.; weight of carbody without electrical equipment, but with seats, 16,800 lb.; weight of trucks, 15,320 lb.; total weight of body and trucks, 32,120 lb.; seating capacity, 46



DETROIT UNITED CARS. Height from track to underside of side sills, 1 ft. 9 3/4 in.; height from underside of side sills over roof, 8 ft. 11 3/4 in.; height from floor to center of headlining, 8 ft. 3 3/4 in.; track to step, 13 in.; step to platform, 10 1/2 in.; ramp in floor, 3 3/4 in.; weight of carbody, including air equipment, 17,480 lb.; weight of trucks, 8,300 lb.; total weight, 25,780 lb.; seating capacity, 57

tudinal seats with cross seats in the motor car, in which the longitudinal seats are placed at each end so as to provide the extra room where it is most needed to relieve congestion about the exits and entrance, giving that car a very satisfactory arrangement.

Although the company operates a very extensive interurban system the statistics for the year 1915—complete with the exception of one division—show that the city lines carried 340,000,000 as against 32,000,000 for the interurban divisions. Of these totals but a comparatively small percentage was given by non-revenue passengers

or employees. The car miles of the company—both city and interurban lines—totalled 44,000,000. The company operates under the usual five-cent fare, but offers seven uniform tickets good on all lines at any time for twenty-five cents. Also, workingmen's tickets are sold under certain restrictions. Transfers are issued to connecting lines and in some cases double transfers are issued with a view toward lessening the congestion in the heart of the city.

The motor car has been developed on the Detroit lines over a period of years from an earlier, non-prepayment type. To this



DETROIT UNITED CARS. These center-entrance trailer cars are the first to be put into service on the lines of the company. They are cars of large capacity, which will tend to relieve congestion in the busy sections of the city, where they have been installed



DETROIT UNITED CARS. The center-door feature of the car made it possible to utilize each end of the car by building in curved seats. The wide aisles guarantee ample room for taking care of emergency traffic

early type was added the "Detroit platform," which has proven unusually well adapted to the traffic conditions of the city. This platform is arranged so that the conductor is completely separated from the incoming and outgoing passengers by a pipe railing, which serves to divide the flow of passengers, the rear door of the two serving as the entrance door, while the door nearest the carbody is used by outgoing passengers, the distinction being plainly indicated by lettering on the step hangers just below the folding doors. Thus, the entering passengers pass into the car by going around the conductor on his right hand, as he

faces the rear to collect fares from them. This arrangement makes a slightly longer route into the car for the incoming passengers, but it has the desirable feature of providing the largest part of the platform for incoming passengers to stand. Thus, at points where the incoming load is heavy all of the passengers may step up onto the platform and the door may be closed and the car started as soon as the exits are clear; the fares are then collected and the congestion of the rear platform cleared.

This car was described in articles published in the April, 1912, issue of BRILL MAGAZINE and in the July, 1913, issue, the former articles

describing the cars fully. However, the cars delivered under this order are three feet longer over the bumpers than were the old cars. This difference in length provides the car with an additional cross seat on each side of the car, the new cars having seven cross seats whereas the old equipment had but six, and the rear platform has been made eleven inches longer than the platform on the old cars, thus further increasing the capacity of the cars for reducing the time necessary for loading. One other change was the substitution of a folding door system at the front of the car for the sliding door used on the old cars.

The trail cars were mounted on Brill low trailer arch bar type of trucks, Brill 27-E-1 trucks being used under the motor cars. The underframes of the cars are all-steel. The side sills are of

angle and the bolsters are built up of plates. The crossings used are I-beams. The platform is also all-steel, the crown sills made of angle, the bumpers of channel and the drawbar sills of channel.

The body frame of the car is of steel, the top rail made of angle, the letter board and belt rail of pressed steel, the side plate 3/32 in. thick and the tee posts measuring 1½ by 2 in. The framing of the vestibule is the same as that of the body.

The sashes are made in two parts, the lower arranged to raise and the upper built stationary. Window guards are provided at the end windows. The center entrance doors are of white oak and are arranged to slide into pockets, the doors glazed with plate glass above and with wired glass below. The cars are provided with both air- and hand-brakes.

The use of "Pay As You Enter" and "Pay As You Leave" signs on one-man cars has been found to be of great advantage. In running a car from the busy section of a city to its outskirts the "Pay As You Leave" sign may be displayed and the loading time materially reduced. Then, on the return trip, the "Pay As You Enter" sign proves itself more efficient. For special traffic, where the load is picked up along the line and discharged at one point, the "Pay As You Enter" sign should be displayed and the "Pay As You Leave" sign used on the return trip. Thus at the point of greatest congestion there is no time lost in collecting fares. This interchangeability of methods of fare collection is proving of great assistance, offering as it does opportunity to adjust the operation to the existing conditions.

CENTER-ENTRANCE CARS FOR EAST LIVERPOOL

ALL-STEEL CONSTRUCTION

FOR operation on its system, one of the most interesting of electric railways, the East Liverpool Traction and Light Company, of East Liverpool, Ohio, recently has installed fifteen double-truck, all-steel center-entrance P. A. Y. E. cars built by the

and suburban service in East Liverpool that the company has installed the cars.

The cars were shipped to the company on their own wheels and under their own power, being run over the Cleveland Railway Company's lines to Miles Avenue and



CENTER-ENTRANCE FOR EAST LIVERPOOL. The auxiliary doors placed at diagonally opposite corners of this car lend to it a desirable elasticity of operation, it being possible to use the center doors as both entrance and exit, with part of the outgoing passengers using the front corner door, or to use the center doors as entrance only. The cars are mounted on Brill Arch-Bar Trucks

G. C. Kuhlman Car Company. The company operates an interurban line running from Rochester, Pa., located in the extreme western part of the state at the junction of the Ohio and Big Beaver Rivers and twenty-five miles from Pittsburgh to Steubenville, following the north bank of the Ohio River the whole distance, which is about forty-four miles. Almost midway between these two cities the line runs through East Liverpool, a city of about 25,000, and it is for urban

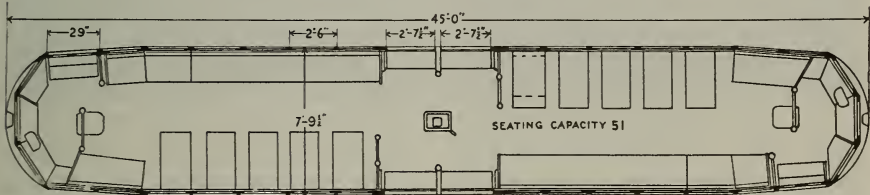
Broadway, Cleveland, and over the Northern Ohio Traction & Lt. Company's property via Silver Lake Junction to Ravenna, Ohio; thence over the Stark Electric Railway's property, via Alliance to Salem, Ohio, and from there over the lines of the Youngstown and Ohio River Railroad to East Liverpool, a total distance of about 110 miles. The crews of the respective roads over which these cars were operated handled the shipments en route.

The city transit system consists

of five separate lines known as the Main Line and the Chester, Pleasant Heights, Grandview and River Road Divisions. The Main Line is routed through East Liverpool to Wellsville, and the Chester and River Road Divisions are looped through the principal streets of East Liverpool. The Pleasant Heights and Grandview Divisions terminate in the "Diamond," near the heart of East Liverpool, and run north and northwest from this point. The "Diamond," as a matter of course, is the heaviest collecting point, and Mulberry June-

grade. The other two divisions, the River Road and Chester Divisions, have only one heavy grade, which is a 6-per cent. rise on the lines in East Liverpool. The company is fortunate in having but few curves on its lines, the shortest curve on any of the divisions being a thirty-foot curve in Wellsville.

The commercial activities of the cities it serves play an important part in the company's operations, East Liverpool being one of the largest pottery centers in the world, and Chester having a tin plate plant. Also at Wellsville, on the



CENTER-ENTRANCE FOR EAST LIVERPOOL. Height from track to underside of side sills, 2 ft. 4 $\frac{1}{8}$ in.; height from underside of side sills over trolley boards, 8 ft. 3 $\frac{1}{8}$ in.; height from floor to center of headlining, 7 ft. 8 $\frac{1}{8}$ in.; track to step, 15 in.; step to platform, 9 $\frac{1}{2}$ in.; ramp in floor, 5 in.; weight of carbody with electrical equipment, 18,910 lb.; weight of heater equipment, 494 lb.; weight of air-brake equipment, 856 lb.; weight of trucks, 8660 lb.; weight of motors, 6680 lb.; total weight, 35,600 lb.

tion, the terminus of the River Road Division in the East End, and Fourth Street, in Wellsville, on the Main Line, are the next heaviest points.

The company faces a somewhat trying condition in the number and pitch of the grades on the lines. On the Main Line there are four pronounced grades in each direction, the maximum being 9 $\frac{1}{2}$ per cent. The track of the Pleasant Heights Division is practically all upgrade, the inclination in some cases being from 7 to 8 per cent. About half the distance of the Grandview Division is up an 11-per cent.

Main Line, there is another tin plate plant of the same company. These three principal towns served by the city system, East Liverpool, Chester and Wellsville, have a combined population of 44,500.

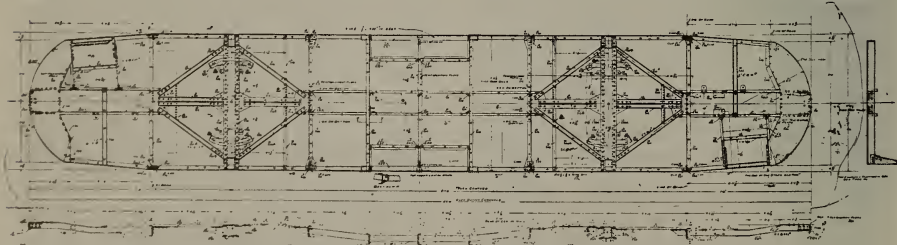
The company at the present time has under consideration the project of rebuilding the Grandview Division, changing the route somewhat, adding approximately one mile to its length and opening up a more thickly populated section than is being served now. The old equipment of the company was of the single-truck type, and these old cars will be used as a supplement

to the service furnished by the new equipment. Although the company has not as yet installed the one-man method of operation, its officials have been seriously considering the proposition for some time.

Chief among the unusual features in the design of the car are the low truck and 24-in. wheels, thus keeping the height from the rail to the floor at the center doors down to 24½ in., the height from the rail to the first step being 15 in., and from the first step to the floor 9½ in. At the corner doors the height from the rail to the car floor is 29 9/16 in., the height from the rail to the first step being 12½ in., from the first step to the second step, 8 9/16 in., and from the second step to the car floor, 8½ in. Thus it may be seen that the floor of the car has been given a very decided ramp in order to keep the floor level low at the center.

The use of the corner doors in combination with the center entrance is also of interest. This feature gives to the car a remarkable elasticity because the two doors at the center of the car may be used as both exit and entrance, the front door being used as an auxiliary exit, or the center doors may be used as entrance doors only. This

flexibility is somewhat of a departure from the usual practice because it does not fasten upon the riding public any definite, unchangeable method of entering or leaving the cars, the conductor merely directing his passengers in whatever direction existing conditions make necessary. The auxiliary front door is operated by the motorman and it thus relieves the conductor of congestion about his station, allowing passengers riding for short distances to leave the car without becoming involved with the entering passengers. This is of decided advantage at heavy loading points such as the "Diamond" and the other termini of the divisions. Another great advantage of the auxiliary corner door is that in taking grade crossings where it is necessary for the conductor to flag the car across or to set a signal or throw a switch, he may leave the car by the front door, which may be opened and shut by the motorman, thus making it unnecessary for the conductor to leave the center doors open and unguarded. Folding seats are placed on each side of the car just within the center doors and thus extra seating capacity is given the car, the seat on the blind side being arranged



CENTER-ENTRANCE FOR EAST LIVERPOOL. For the seating capacity, 51, the carbody—which weighs but 18,910 lb.—is exceedingly light



CENTER-ENTRANCE FOR EAST LIVERPOOL. The combination of longitudinal and cross seats relieves congestion, allowing plenty of standing room

to drop down for that purpose.

At each end of the car there are two stanchions which support the motorman's seat and are also used for the curtain which cuts off the reflections from the interior of the car at night. On the inner side of the stanchions there is another seat, thus taking care of an additional passenger at either end. For the rest of the car, longitudinal and cross seats are used, with round seats at each end. One of the most notable features of the car is in the arrangements of these stationary seats at each end of the car. The controllers are placed below the seats and the controller drum is carried up through a pipe railing at about the height of an average arm-rest. The controller drum comes up through the hollow reverser shaft, thus making controller

and reverser handles concentric. To the right of the motorman another piece of pipe railing forms a support for the removable hand-brake wheel and the air-brake handle. At the end of the car which is being used as the rear all of these handles are removed, leaving the pipe railings with no projecting pieces and thus permitting the comfortable seating of passengers.

In the underframe of the car side sills of 3 by 2½ by ¾-in. steel angles extend continuously from buffer to buffer. The center sills, structural steel channel sections, extend through the center of the car from buffer to buffer except over the motors, where they are replaced by a diagonal framing. These center sills are fastened to the buffers and crossings with gussets and angle plates.



CENTER-ENTRANCE TYPE FOR WARREN & JAMESTOWN

BRILL HIGH-SPEED TRUCKS

ONE of the most interesting recent types of cars is a double-end, stepless, center-entrance, combination passenger, smoker and baggage car built by the G. C. Kuhlman Car Company, of Cleveland, Ohio, for the Warren and Jamestown Railway Company, for use on the lines of the company running between Warren, Pa., and Sheffield, Pa., and between Warren and Jamestown, N. Y. The stepless center-entrance feature of the car is a departure from the type of equipment now in use by the company, the other cars all having entrances at the rear.

Despite the difficulties encountered in the special baggage compartment, where longitudinal seats had to be placed before the sliding doors so that they easily may be removed when the use of the compartment for the handling of baggage is desired, the seating arrangement of the car is well adapted to interurban service, in which the

passengers ride for fairly long distances, 32 of the total 47 passengers sitting on cross seats while eight have longitudinal seats, five sit at an angle with the axis of the car and two are provided with a transverse seat facing the rear on the rear platform. In addition to this feature of the car there is the added advantage that there is sufficient room about the center-entrance to prevent crowding and to facilitate loading and unloading of passengers.

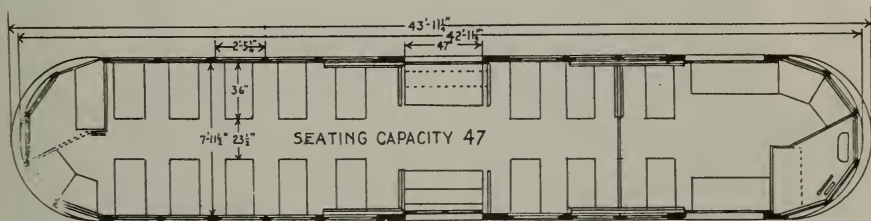
The lines of the company pass through a territory which has for its principal industries lumber, coal, oil and gas, refining and furniture and wool manufacturing, several factories being located at Jamestown, which has a population of 35,000, while Warren, with 15,000, does considerable business in lumber, oil and gas. Outside of the terminals the lines have a total tributary population of 30,000, guaranteeing ample demand for

traffic facilities. There are grades on the line as steep as 5 per cent., the longest being one mile in length and varying from 2 to 5 per cent. The stepless center-entrance car purchased by the company is as well adapted to this service as it is to that of city lines, its time-saving features being just as effective and its construction interfering in no way with the maintaining of high-speed schedules on the lines, the trucks on which the cars are mounted being designed for a maximum speed of fifty miles per hour.

The depression in the side of the car to take care of the center-entrance is effected by dropping the side sills from a 3 ft. 2 9/16-in. light-load clearance between the rail and the underside of the side sills at the trucks to a clearance of 7 7/8 in. at the center, bringing the step height down to 13 in. Between this first step and the floor level there are used three 10 1/2-in. risers, the steps 10 in. deep. The step openings are closed with spring-balance trapdoors, making it possible to lower the door on the far side of the car and to drop a folding seat over this added floor space, accommodating two extra persons.

The car, of semi-steel construction, weighs but 21,000 lb., which is as light as was consistently possible, the frames for the doors at the center-entrance and in the baggage compartment, which are reinforced on the top rails and also on the side sills, forming with the side sills a truss for the side of the car. Also by making the girder formed by the top rails, the side sills and the side posts carry the strain, the side sills were made considerably lighter than otherwise would have been the case.

The feature of the extra compartment gives to the car an elasticity which makes it adaptable for service under a wide range of conditions. By utilizing all the seats in the compartment the car is given a good seating capacity for handling heavy or emergency traffic, it being possible to throw the bulkhead door open and thus convert the two compartments practically into one continuous compartment, making no distinction between the passengers riding in them. The glass in the bulkheads and in the partitioning door between the two compartments is large enough to safeguard against either compartment being dark under this arrangement. Or,



CENTER-ENTRANCE TYPE FOR WARREN & JAMESTOWN. Height from rail to underside of side sills, 3 ft. 2 9/16 in.; height from rail over trolley plank, 12 ft. 1 1/8 in.; height from rail to first step, 13 in.; weight of carbody without electrical equipment, 21,000 lb.; weight of electrical equipment, 1000 lb.; weight of airbrake equipment, 2000 lb.



CENTER-ENTRANCE TYPE FOR WARREN & JAMESTOWN. The interior of the car is finished in cherry. The seats in the main compartment are reversible and upholstered; those in the smoking compartment are of cherry-wood slats

by closing the partitioning door, the forward compartment may be given over to the use of smokers, a feature which tends to make for public favor on interurban lines, where the run between terminals is fairly long. Then, the compartment, by means of its removable longitudinal and diagonal seats, may be converted into a baggage compartment, the seats being readily folded up from their positions in front of the baggage doors. These side doors are large enough to take care of large pieces of baggage and make loading and unloading easy.

The underframe, sides, roof and the side, corner and vestibule posts of the car are of semi-steel con-

struction, the floors and sash rails of wood and the sash stiles of bronze. In the underframe side sills of 6 by $3\frac{1}{2}$ by $\frac{5}{16}$ -in., 9.8-lb. angle extend in one piece from corner post to corner post, bent down to support the steps at the center door opening. Each bolster is built up of two $\frac{1}{2}$ -in. pressed steel channels, $8\frac{1}{4}$ in. over all in the center with $\frac{5}{8}$ by 10-in. top cover plate and $\frac{3}{4}$ by 10-in. bottom cover plate, both top and bottom plates bent so that they come under the side sills and carry the car. On each side of the step the crossings are 3 by 3 by $\frac{1}{4}$ -in., 4.9-lb. trussed angles, one at the top, one at the bottom and one used as a double diagonal brace. On the

center crossing the top chords are cut short so as to allow the sliding door to pass and vertical angles are used to connect the top chord on this crossing to the bottom chord. Between these trussed crossings and the bolsters there are installed at each end, two 3-in., 5.5-lb. "I" beams fastened to the side sills.

One of the features of the car is the double flooring. There are used two floors, each running longitudinally, the bottom floor of yellow pine and the top floor of maple, laid with screws, the top flooring painted on the bottom before being laid and the tongues and grooves

treated with white lead mixed with linseed oil.

The platforms are level with the car floor. Two knees at each end, starting from a point back of the bolsters, are made of 6 by $3\frac{1}{2}$ by $\frac{5}{16}$ -in., 9.8-lb. angle iron, the 6-in. leg horizontal and the angle extending under the side sills for a distance of about 3 ft. 6 in., from which point they extend diagonally toward the crown piece angles, to which they are fastened securely by rivets. These knees pass through the trussed crossings which form the end sills. Between the end sill and the crown angle, three crossings are securely riveted to these



CENTER-ENTRANCE TYPE FOR WARREN & JAMESTOWN. The adaptation of the low center-entrance body design to interurban service with high-speed trucks makes this type one of the most interesting recently built

knees and a 3 by 3 by $\frac{1}{4}$ -in., 4.9-lb. angle, for crown piece support, also is used.

The top plate is of $3\frac{1}{2}$ by 3 by $\frac{5}{16}$ -in., 6.6-lb. angle, the belt rail of $3\frac{1}{2}$ by $\frac{7}{8}$ by $\frac{3}{8}$ -in., 5.4-lb. angle. The posts are arranged as in steam railroad cars, alternating double and single posts. For this construction $1\frac{1}{2}$ by 2 by $\frac{5}{16}$ to $\frac{1}{4}$ -in. "T" posts are used, one at each single post and two at each double or pier post.

For the maintenance of the rapid schedules of the company the cars are mounted on Brill 27 M. C. B. 2-X Trucks, with 33-in. wheels and a wheelbase of 6 ft. 3 in. This truck, built with a distinctively Brill frame and Brill features, is perfectly suited for high-speed operation. The torque of powerful motors, the frequent strains of rapid applications of the

brakes when running at high speed, and the cornerwise thrust which is set up when taking curves, all demand a truck with solid-forged side frames for perfect safety and for economic operation.

The Brill Company is the only maker of trucks with solid-forged side frames—trucks in which the pedestals form an integral part of the frame. These frames are guaranteed against breakage from any cause other than accident.

Another point in which this truck excels as much as in the feature of the solid-forged side frames is the manner in which juncture is made between the side frames and the transom. Forged gusset plates of large dimension are bent over and bolted through the side frame, the ample thickness of the forged side frame making this connection possible.

The recent report of the A. E. R. A. Bureau of Information showed that out of a total of 111 American cities in which one-man car operation is in use, thirty cities in 1910 had a population of more than 25,000, which means that 27 per cent. of the cities using the one-man method of operation were cities of large population. Eight other cities ranged between 20,000 and 25,000 population and forty-five others were between 10,000 and 20,000, leaving for the small city of less than 10,000 a total of but twenty-eight. Of the thirty companies operating in cities with more than 25,000 inhabitants there were two companies the populations of whose cities were more than 500,000; one city over 400,000; one over 300,000; two over 200,000, and one over 100,000, which shows the favor with which one-man operation is being met, and its ascending popularity for larger city operation.



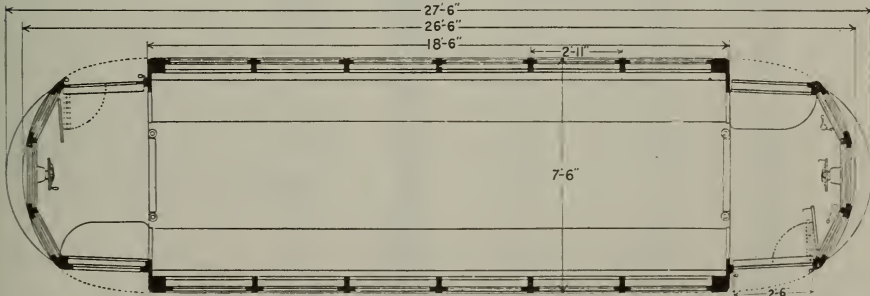
ONE-MAN CARS FOR TUCSON, ARIZONA

LIGHT WEIGHT A FEATURE

FOUR double-end cars designed for one-man operation have been completed by The Wason Manufacturing Company, of Springfield, Mass., for the Tucson Rapid Transit Company, of Tucson, Arizona, for use in the city of Tucson, which is located in the southeastern part of the State, and which has a population of 18,000. The company, which is controlled

by the Federal Light & Traction Company, of New York City, operates about five miles of city track, power for operation being rented from the Tucson Gas & Electric Light & Power Company.

The lines run through the business and residential sections of Tucson, and the light equipment will, therefore, enable the company to raise the efficiency of its service



ONE-MAN CARS FOR TUCSON. Height from rail to top of roof, 9 ft. 9 ³/₈ in.; height from rail to platform, 15 ¹/₂ in.; height from platform to car floor, 9 in.; total weight, fully equipped, 11,000 lb.; weight of bodies, 5498 lb.; weight of running gear and motor equipment, 4100 lb.; weight of air-brake equipment, 1402 lbs.; seating capacity, 28



ONE-MAN CARS FOR TUCSON. These cars are designed for one-man operation and may be operated from either end. They are light in weight and therefore will make for economy.

by 2 by $\frac{1}{4}$ -in. angle, which are placed 2 ft. 2 in. apart and 2 ft. in from the heavy cross members.

The posts are fastened to a wooden member secured to the side sills, the corner posts being 2 in. and the body posts $1\frac{3}{4}$ in. The roof is supported on $\frac{3}{4}$ -in. wooden arches placed at each of the body posts and midway of the posts, and is reinforced by steel arches at each post. The wood used in the construction of the car is southern pine, white oak, ash and mahogany, the sheathing being $\frac{3}{8}$ -in. poplar backed with burlap.

The steps are placed at diagonal corners of the car, on the right-

hand side of the motorman. The doors, which are of solid mahogany, are controlled by and open toward the motorman.

The seats are made of mahogany slats, and are longitudinal, being covered with dark green carpet upholstery extending up to the window sill and made so as to be easily removed and replaced, it being the intention of the company to use the seats bare in the summer and with the carpet in the winter. Permanent seats are placed in the blind side of the vestibules, and folding seats are provided for the spaces occupied by the door, giving the car a good seating capacity.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

LOYALTY

LOYALTY in a man is one of his most essential characteristics. Without it he is without power to do work of the kind that counts. Let it be loyalty to a principle, loyalty to his employer, loyalty to a sect; just so it is loyalty to some constant thing or person it will serve its purpose.

There is nothing by which we may judge better a man's character than by his ability to remain loyal to one given thing. Strength of character, determination, integrity, all of these are indicated in a man by the degree of his loyalty. Find a man who is loyal to an animal, a person, a belief, and you will have found a man worth while—a man in whom there is good, even though a careless world may never have discovered it.

Loyalty has kept men at their tasks through countless ages. It is the beacon light that guides storm-tossed, temptation-wracked human vessels over life's rough seas, twinkling ever just over the bow and offering a constant hope to the mariner.

Give me the man who is loyal and you can have the man who is rich—perhaps he was born so. Yes, and you can have the man who is called the Big Man of the world—do you know how many souls have been trampled under his feet in his wild rush gloryward? But the man who is loyal—he'll be with you when you're up and he'll be with you when you're down because he has in him that which is infinitely finer than wealth or great glory. He has in him an appreciation of the finer things of life—a regard for his fellowhumans. Yes, find a man who is loyal and ninety-nine times out of a hundred I'll be able to show you a man who's fine, bigminded, a live-and-let-live sort of a chap.

A cheerful countenance, a polite, intelligent attention to business, is what pleases the patrons of your road and therefore makes your employers satisfied with your work.

Sometimes ideas come to you about the operation of the road—how it could be improved upon in many ways—little or big. What do you do about those ideas? Are they wasted or do you see to it that they are brought to the attention of the proper person? Many a great big important thing has grown from a little idea. Don't bury yours.

STUDY YOUR CAR

ONE of the surest ways of getting along is to study your car. Spend a few minutes every day in getting down—perhaps at the terminals of your runs—and looking under at the trucks and their rigging, studying their arrangement and mechanism. Before long you will be able to tell at a glance just when and where an adjustment is needed, and, by sending your car into the barn for this adjustment instead of allowing the part to wear, you will have stuck a bright feather in your cap. The man who turns in a trouble report which reads like a kindergarten's effort does not make much impression. True, he may never have been taught these things about his car, but nevertheless the opportunity for him to learn has been yawning at him ever since he first boarded his car, and if he presents an intelligent, straight-from-the-shoulder report, he proves to everyone who sees that report that he has been working his brain a bit, and therefore he draws favorable attention to himself.

A man who is enthusiastic about his job and loyal to the road for which he works simply cannot be kept down. He'll be noticed sooner or later—more than likely sooner.

THE PRACTICAL JOKER

THE platform man who is able to find time to play practical jokes on his fellow-workmen, his crewmate, or others, is certainly in need of something. Perhaps it's a taste of discipline, maybe it's simply an adjustment of his brain machinery, which must be short-circuited somewhere. Besides being undignified for a grown man to be playing pranks and cavorting about a trolley car as a four-year-old boy might play about the street or backyard, it is decidedly unsafe for the many persons who daily ride under the care of this joke-inclined motorman or conductor. If one-tenth of the surplus energy which causes such a man to find relief in this silly practice were converted into honest, energetic work, that man would be much better off at the end of the year and well on his way to promotion instead of being eyed anxiously by his employers.

James J. Hill, the "Empire Builder," began as a farmer's boy and was very, very proud of himself when he took his first step upward and became a coal shoveler. And now—well, we all know of his greatness. Doesn't it do the imagination good to think of where he started and where you may land if you make a similar start? There are at present five men holding good executive jobs on the Pennsylvania Railroad, all of whom began as messenger boys. Where do you intend to stop?

You have a right to be selfish if your aim to be courteous in your dealings with your company's patron is prompted by a selfish desire for promotion. Your company and you will divide the profit from this selfish ambition and both will be well pleased.

Are you a pessimist? Are you dissatisfied with your job as a motor-man or a conductor? Do you continually growl about your hard lot and what little chance there is of your ever being promoted to something better? If you are that kind of a man you are almost as bad as a parasite, a man who draws his pay and does practically nothing in return. You are doing yourself a great deal of harm by allowing this attitude to take hold of you so completely, and it is certain that you are not helping the company a bit. How long will it take you to find yourself out and to look up the ladder and realize that that is your place away up at the top there, many rungs above where you are now? Then, how will you get there? By growling? No, by hustling and whistling about your work.

Why should it ever be necessary to point out the men who have begun at a low station in life and who have climbed to the top? It's just the same with everything. Everything must have a beginning. There is the flower seed. Someone buys a package of costly, carefully selected poppy seed and plants it with the greatest of care in rich, highly cultivated ground where it is nourished and has every protection. Then along comes a red-headed, whistling boy with his grimy fist full of seed he has pulled from a ripe hollyhock stalk or a full sunflower pod. He stumbles and the fistful of seeds goes spilling all over the ground. The first thing we know the gardener is calling down curses upon the head of the dishonest seedsman who has sold him hollyhock seed in a poppy package. What's the reason? Health, vitality. The hollyhock threw the poppy and choked the life out of it and then lived on what had been intended for its victim. You do the same. You don't need the highly cultivated soil for your start. Begin in a sand lot, if you must, but begin at any cost, and then see how quickly the red-headed boy will come along and accidentally transplant you into a better place. It'll work, because it's Nature that's back of the scheme.

CHANGES OF ADDRESS

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



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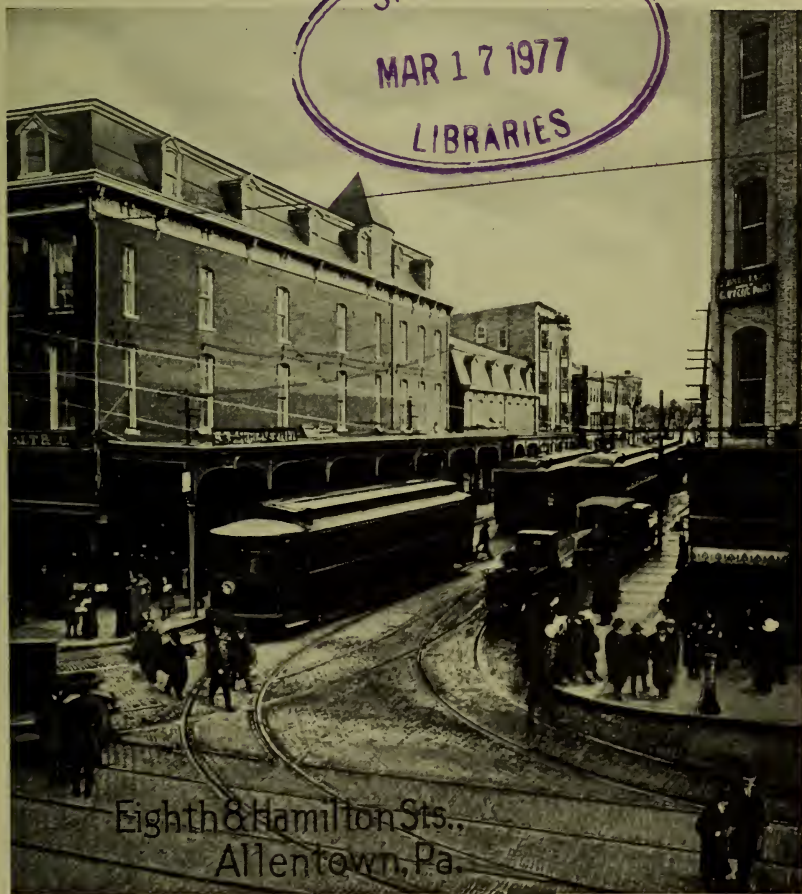
STREET SPRINKLING

THE season of the year when everything is hot and blistering and dry as punk will be with us before so very long now, and once again the problem of preparing for that season presents itself. Trolley cars rushing along over dry, unwatered streets cannot fail to kick up a dust that will aim a body blow at the public favor built up by months of careful operation. The inevitable suction of the trucks and low-hung motors picks up great clouds of dust which fill the car, making breathing uncomfortable and creating a distaste for riding on the part of the public, and which also get into the motors, forming a tendency toward large maintenance costs. A power sprinkler used regularly does away with all this. It thoroughly flushes the roadbed between the rails and to some little distance on each side of the track and sprinkles the street to the curb, laying the dust. Send for the "Centrifugal" catalog describing the sprinkler that has been standard for more than ten years.

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Brill Half-ball Brake Hanger

IS it a hard proposition to hook up a brake-hanger to a dollars-and-cents line of reasoning? Not if you stop to consider the harm to an equipment—but more especially to public favor—that may be done if the ordinary hanger, which quickly wears loose, is allowed to bang and clatter its way about the city streets and, because of its inability to hold the shoes properly in alignment, to set up shivers and quivers through the whole car every time the brakes are applied. These vibrations mean a shortened life for the truck and the car and for patronage. The remedy is very simple—install Brill Half-ball Brake Hangers.



A. P. Fehr.

PRESIDENT, LEHIGH VALLEY TRANSIT COMPANY

Constructing the Permanent Way

Almost any man of normal capacity can build beautiful, happy castles in the air; that is simply his optimism finding an outlet for itself. But when it comes to the real power to do, the crucial test of a man's character, a woefully large majority of these air palaces come tumbling down about the ears of man. The lacking attribute is power of will.

Will power, properly tempered, correctly guided, is the dynamic force back of a man which gives his brain ability to translate thought into definite, positive action. It erects these lovely air castles on safe and firm foundation and builds them realities, things of which to be proud.

In many men the power of will is cramped, dormant, unused. It needs a brisk run up and down the training path of life, regular and continued exercise, to keep it in proper form.

No more striking example, no finer model to follow, could be furnished than that which may be taken from the engineering world. A construction engineer starts to build a railroad. On that railroad is a place that must be tunneled. He has prepared for that and he drives ahead through sand and dirt and rock. Suddenly he comes to a solid rocken wall that nips the temper out of his machinery. Does he turn back and go around the mountain? He cannot; he does not; he plugs steadily on until he sees daylight ahead. The simile is exact. Such will power cannot fail to tunnel any of the seemingly impassible obstacles on life's highway.

MARCH 15, 1916

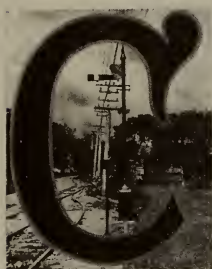
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HARRISON R. FEHR

HARRISON R. FEHR was born near Nazareth, Pa., on March 20, 1863, and was educated in the Moravian schools at that place. He taught in the public schools from 1880 to 1883, when he entered the employ of the Lehigh Valley Railroad Company, in the civil engineering department. His work embraced re-location of tracks, maintenance-of-way work and construction of branch roads. In 1889 and 1890 he was construction engineer of a system of water works for Lehigh, Pa., and prepared plans and specifications for gravity supply and storage reservoirs. He also made surveys and designed a system of water works for Annville, Pa. From May, 1890, to October, 1891, he was employed in the bridge department of the Lehigh Valley Railroad as engineer in charge of the New Jersey, Lehigh and Wyoming Divisions and coal branch roads. From October, 1891, to September, 1899, he was city engineer and commissioner of highways of Easton, Pa. From 1899 to January, 1901, he held the position of engineer for the Easton Transit Co., and from the latter date to September, 1902, chief engineer of the Trenton & New Brunswick Railroad Co. From September, 1902, to May, 1904, he was consulting and contracting engineer. In May, 1904, he was made General Manager, and in 1906 President of the Easton Transit Co., operating about fifty-four miles of electric street railway in Easton, South Bethlehem and Nazareth, Pa., and Phillipsburg, N. J., which office he filled until October, 1913, when he removed to Allentown and became President and General Manager of the Lehigh Valley Transit Co., and affiliated companies, which operate 215 miles of electric railway from Phillipsburg, N. J., to Slatington, Pa., and south to Philadelphia. He is also President of its lighting companies, which distribute electric light and power throughout the Lehigh Valley and as far south as North Wales. Mr. Fehr is a member of the American Society of Civil Engineers, the Engineers' Club of Philadelphia, the American Electric Railway Association and the National Electric Light Association.

INTERURBAN CENTERS AND INTERURBAN CARS

ALLENTOWN



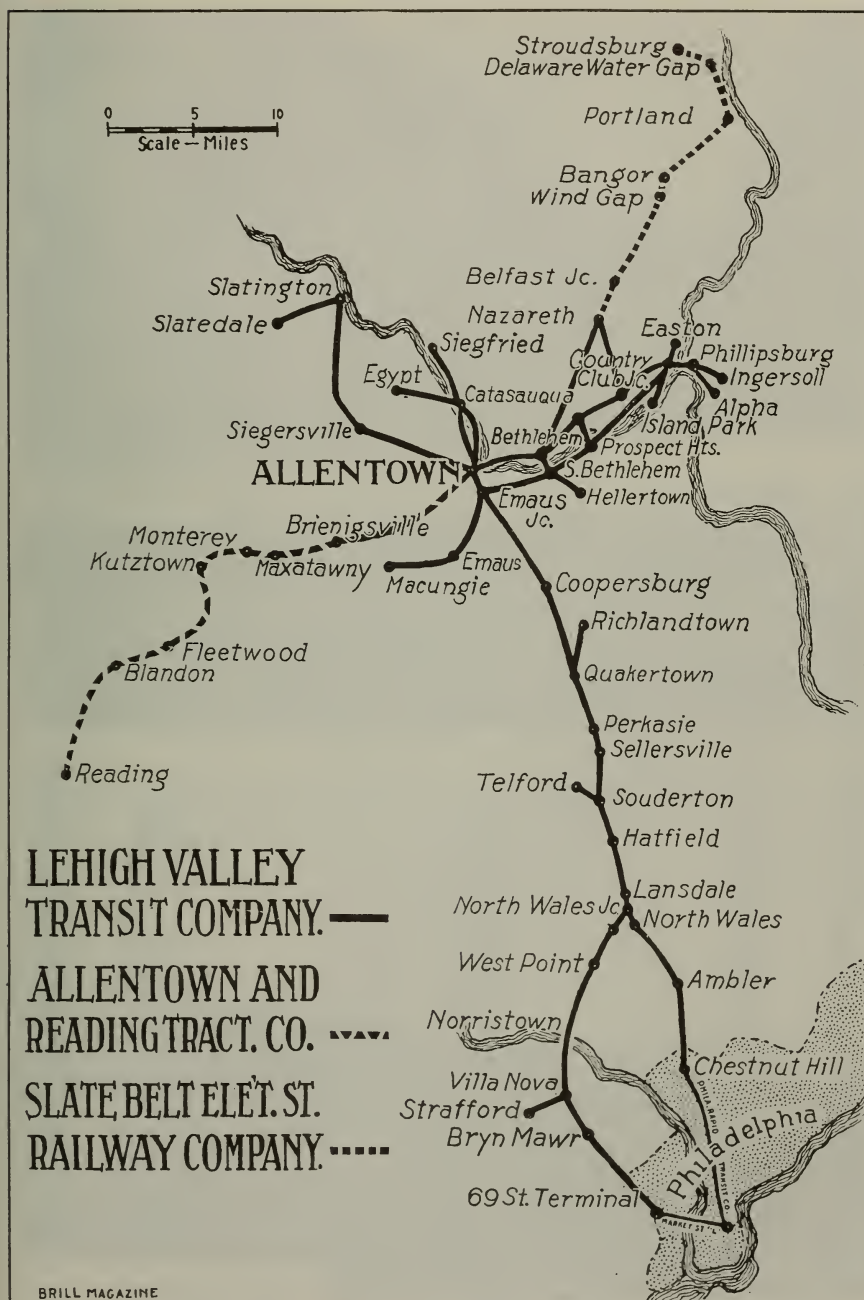
COUNTY seat of Lehigh County, one of Pennsylvania's most progressive and historically interesting counties, and located

but fifty-five miles from Philadelphia, Allentown, despite its comparatively small population, has become the center of one of the most interesting and modern of interurban systems. Several circumstances have been responsible for this. The location of the city in the heart of the picturesque and historic Lehigh Valley and its proximity to Bethlehem and South Bethlehem and to Easton (seventeen miles away) are the principal reasons for the growth of its interurban lines. Establishment of a good means of transportation between these four most important cities of the valley—Easton, Bethlehem, South Bethlehem and Allentown—was inevitable and Allentown, of the group the nearest to Philadelphia, was of course the logical center for the system. By means of connection with a foreign line at Nazareth—a short distance to the northwest of Easton—through transportation is possible to the Delaware Water Gap, one of the most popular summer resorts in the east, and to

Stroudsburg, a short distance beyond the Gap. Also by means of a line running from Allentown to Reading, a distance of about forty miles, connection is made from Reading to Philadelphia or from Reading to Allentown, the Bethlehems, Easton or, via Nazareth, to the Gap and Stroudsburg. Also, connection is possible between Reading and the towns reached by the various branches running out of Allentown, such as Slatedale, Northampton, Egypt, Macungie and Hellertown. The line from Reading to Allentown is operated by the Allentown and Reading Traction Company, the other lines, from Philadelphia to Allentown and beyond, being under the ownership or control of the Lehigh Valley Transit Company.

The city of Allentown is situated on high ground sloping gently toward the river and commanding diversified views of the surrounding country. Hamilton Street, the principal thoroughfare of the city, extends for more than two miles from east to west through the city's heart. It is on this street that the lines of the Lehigh Valley have their termini. The city is the seat of the Allentown Women's College, a Reformed Church institution; and of Muhlenberg College, a theological seminary.

The city's manufactories are considerable. It ranks second in





LEHIGH VALLEY TRANSIT COMPANY
Near Summit Lawn, Lehigh Mountains Bridge south of Sellersville
Philadelphia Division, looking toward Lehigh Mountains



INTERURBAN CENTERS AND CARS. Coal conveyor at Allentown powerhouse

the country to Paterson, N. J., in the making of silk and silk goods, has extensive lumber yards and its manufactures include iron and steel mining machinery, automobile trucks, furniture, cement, thread, cigars, slaughtering and meat-packing products, boots and shoes, men's clothing, hosiery and knit goods, jute and jute goods, malt liquors, brick, barbed wire and wire nails and planing-mill products. The value of these products increased 90.9 per cent. from 1890 to 1900 and the value of the city's factory products grew 13.2 per cent. between 1900 and 1905. The total

factory product in 1905 was valued at \$16,966,550, of which \$3,901,249, or 23 per cent., was the value of silk and silk goods. For the shipment of this large output the city depends, in addition to its interurban service, upon the Lehigh Valley Railroad, the Philadelphia and Reading Railway and the Central of New Jersey, all of which serve the city. The country surrounding

Allentown is well adapted to agriculture and slate, iron ore, cement rock and limestone are found in the vicinity. The first Portland



INTERURBAN CENTERS AND CARS. Powerhouse at Allentown



INTERURBAN CENTERS AND CARS. Three-mile run

cement quarry operations were within ten miles of Allentown.

Allentown was settled about 1751 and was laid out as a city in 1762 by James Allen, son of one of the Chief Justices of the Province of

Pennsylvania. In 1811 it was incorporated as a borough and the name was changed to Northampton. The next year it became the county seat and in 1838 its present name was again adopted, the city charter being granted in 1867. One of the most important dates in the history of the city is 1881, in which year the silk industry was introduced.

It was at Allentown that Colonel James Bird displayed much heroism in the wars against the Indians and that John Fries, of "Fries Rebellion" notoriety, fomented opposition to the "window tax." The city was first inhabited by a few wealthy Germans and the very wealth of its founders, coupled with the cutting off of the place for several years from the post routes, seemed to act as a drag on the city's progress and it



INTERURBAN CENTERS AND CARS. Subway under railroad at Perkasié



INTERURBAN CENTERS AND CARS. Company's bridge to South Allentown

remained unprogressive until its selection as the seat of Lehigh County in 1812. In 1828 one of the most formidable obstacles in the path of its progress was removed by the acquisition on the part of the city of the waterworks. The progress being made at present may best be seen from the last three census reports. In 1890 the population was 25,228; in 1900 it was 35,416, and in 1910 it had grown to 51,913.

The Lehigh Valley Company operates, through a territory famed for its natural resources and industrial activities, more than 200 miles of rock-ballasted interurban roadbed, connecting Philadelphia with Allentown, Bethlehem, South Bethlehem, Easton, Nazareth, Slatedale, Northampton, Rich-

landtown, Macungie and serving en route such towns as Ambler, Norristown, North Wales, Coopersburg and Perkasio. In addition the company operates a large network



INTERURBAN CENTERS AND CARS. Bridge at Allentown built by Lehigh Valley Transit Company



INTERURBAN CENTERS AND CARS. Lansdale looking towards Norristown

of urban lines in Allentown.

The main line of the company, running from Allentown to Sixty-ninth Street, Philadelphia, and known as the "Liberty Bell Route," gets its name from the fact that its tracks run over the route that was taken by the patriots in 1777 in spirited the famous old Liberty Bell from the City of Brotherly Love to a safe hiding-place in Allentown. Great as is

cars of modern design are run on rapid schedules, making the trip from Philadelphia to Allentown, a distance of 55 miles, in one hour and fifty-eight minutes, the stops averaging but one in five miles. By connection at Nazareth with the Slate Belt Electric Street Railway Company a through route from Philadelphia to the Delaware Water Gap and to Stroudsburg is made possible. For the trip of about fifty-five miles between Philadelphia and Allentown a one-way fare of \$1 is charged, with a round-trip rate of \$1.86. Fare collection on this division is by ticket, the other divisions having zone collections.

Linking together the main cities of picturesque Lehigh Valley is the line running from Allentown



INTERURBAN CENTERS AND CARS. Station at Sellersville

through Bethlehem to Easton, a distance of about seventeen miles. The fare for this distance is thirty cents each way. Although the district through which this line passes is growing very rapidly there still are extensive farm lands, the fertility of which make possible bumper crops. The company also operates limited service to Slatington, northwest of Allentown, and to Nazareth, to the northeast. The running time of each of these lines is one hour. Other lines of the company converging in Allentown serve Catasauqua, Egypt and Northampton on the north, South Bethlehem and Hellertown on the east and Emaus and Macungie on the west. To help boost the demand for traffic facilities during the summer season the company maintains several very attractive amusement parks.

The company does the entire lighting and power business in Allentown, Bethlehem, South Bethlehem, Slatington, Catasauqua, Emaus and the adjacent territory, serving a population of about 200,000. Power is also wholesaled to Macungie and to several municipalities along the line be-



INTERURBAN CENTERS AND CARS. Bridge over highway at Perkasio

tween Allentown and Philadelphia, including Coopersburg, Sellersville, Souderton and North Wales.

A comparatively recent addition to the company is a reinforced concrete bridge erected between Allentown and South Allentown. This bridge, of the best construction, is said to be the largest structure of its kind ever erected by a trolley company. It is 2,650 ft. long, 138



INTERURBAN CENTERS AND CARS. Sub-station at Washington Square



INTERURBAN CENTERS AND CARS. Typical stretch of roadbed of Allentown and Reading Traction Company, midway between Allentown and Reading

ft. above the river, and 46 ft. wide overall. It has a roadway 32 ft. wide upon which toll is collected by the company. It was opened November 17, 1913, at a total cost of \$500,000.

During the last year, although no extensive construction work was begun by the company, special attention was devoted to improving the existing trackage by rebuilding track, installing guard rails, re-tieing, resurfacing, rebonding rails and rebuilding bridges. About 8,000 ft. of guard rail have been installed on curves and bridges, and the bridges at Dry Run, Egypt, Emerald, Jones, Jordan Creek, Perkiomen, Steckel's, and over the P. & R. Railway at North Wales and Quakertown, the bridge at Catasauqua, the Brush Meadow bridge, and the bridge over the Ironton Railroad at Hokendauqua, all have been rebuilt or strengthened to accommodate eighty-ton

two-car trains. Ten per cent. of all the ties on the system were renewed and 132 miles of track were tested as a result of which 9,000 bonds were replaced.

The financial report of the company for the fiscal year shows that the company has enjoyed the largest earnings in its history and is in a strong financial position. The total operating revenues increased 10 per cent. and the net income increased more than 50 per cent. The traffic statistics show that during the year the car mileage totaled 4,781,524 and the passengers carried, reckoned upon the basis of a five-cent fare per passenger, totaled 31,100,000. The transfer passengers totaled 2,930,000.

For the operation of its lines the company generates its own power, having a steam plant in Allentown with a present capacity of 18,000 kw. and, upon the completion of a



INTERURBAN CENTERS AND CARS. To the left is an iron works just outside of Reading. For some distance the tracks of the company parallel those of the Allentown Branch of the Philadelphia and Reading, also shown on the left

new unit, a capacity of 29,000 kw. The current from this plant is transmitted at 13,200 volts and stepped down into 600 volts for the line current. Sub-stations are located at Ambler, Washington Square, Lansdale, Sellersville, Coopersburg, Bethlehem, Hecktown, Catasauqua, Siegersville, Slatington and Front Street, Allentown. For three-car train operation a new sub-station will be built at Quakertown and one on Lehigh Mountain. Within the next year it is purposed to install a new turbo-generator in the powerhouse, two new sub-stations and feeder on the Philadelphia Division, and several rotary converters in the various sub-stations.

The cars of the company are run singly and sometimes in trains of two cars. Light freight also is handled by the company, merchandise and goods of every de-

scription from shoes to machinery being accepted. Produce and market goods, with live stock limited to poultry, are accepted; but no carload lots are handled. This freight service is maintained on the Philadelphia Division by way of the Chestnut Hill or local branch, which leaves the main line at Wales Junction, the main line (providing the limited service to Sixty-ninth Street) running through Norristown and over the tracks of the Philadelphia & Western Railway. The Adams Express Company operates over the lines of the Lehigh Valley, its business having shown a steady yearly growth.

For the normal daily operation of all of its lines the company uses about 135 passenger cars, out of a total of 170 closed cars. The cars used on the main line have an overall length of 55 ft. 10½ in., a width of 8 ft. 10 in. over the side sheath-

ing, a seating capacity of 56 persons, and a total weight fully equipped less passenger load of 82,600 lb. They are built for single-end operation on steel underframes and are mounted on high-speed trucks with four 125-hp. motors, the trucks capable of sixty miles per hour. They are equipped for both trolley and third-rail current collection, the P. & W. Ry. from Norristown to Sixty-ninth Street being third-rail.

The other distinctive type of car in use by the company for city operation is the car used between Bethlehem and South Bethlehem. This car, of the pay-within double-end type, measures 43 ft. 5 in. overall, 8 ft. 8 in. over the side sheathing, has a seating capacity of 44 persons, and a total weight of 49,000 lb. The cars are built on composite underframes and are mounted on Brill M. C. B. trucks, designed for a speed of thirty-five miles per hour and equipped with four 40-hp motors.

The Allentown and Reading

Traction Company operates over forty miles of single-track roadbed, running from Reading to Kutztown and from Kutztown to Allentown. For four miles outside of Allentown the line is double-tracked. The territory through which this line operates has a total estimated population of 175,000, Reading's census returns showing 110,000, Kutztown 3,000 and Fleetwood 2,500. The lines pass through one of the most picturesque sections of the state, the tremendous mountains towering on each side of the valleys through which the cars run and forming an imposing background. For a large portion of the route the company's tracks parallel those of the Allentown Branch of the Philadelphia and Reading Railway Company.

The company generates its own current at a steam powerhouse located at Kutztown, the D. C. lines being 550 volts and the A. C. lines, which furnish lighting current to the customers of the company, 5,500 volts. A small amount

of additional current is purchased from the Lehigh Valley Transit Company for use between Allentown and Breinigsville, which is midway from Allentown to Kutztown. Also, at Blandon, midway between Kutztown and Reading, there is a storage battery station which serves to take care of peak loads. The equipment in use by



INTERURBAN CENTERS AND CARS. Powerhouse and car barn located at Kutztown

the company averages about 34 seating capacity and weighs in the main about 20 tons. Among the cars used are a number of Brill cars of the Semi-Convertible type. Brill trucks being uniform for the entire line. For normal operation there are fifteen cars and the company has a total of 28 available for

use. Fare collection is made direct by the conductor, the line being divided into five-cent fare zones and the conductors ringing up each fare. The maximum speed is about thirty miles per hour, the lines being laid for the most part on private right-of-way outside of the cities which are served.

One of the most important items of business is the freight service maintained between Reading and Allentown, two round trips being made each day. On each of these trips the car carries a capacity load, the freight being stacked to the roof of the car.

The company operates its cars into Reading over the lines of the



INTERURBAN CENTERS AND CARS. Station at Pastime Farms

Reading Transit and Light Company, to which company it pays toll for the use of the roadbed. In Allentown the cars operate into the city within one square of the terminal of the Lehigh Valley Transit Company's Philadelphia Limited. The Allentown and Reading cars leave Reading on the hour, require two hours and fifty for the trip and thus allow the passengers for Philadelphia ten minutes.

Just outside of Allentown the company's lines pass Pastime Farms, at which station the Woman's College is located. This station gives the company a steady and good income, averaging from 125 to 150 passengers per day.

The series of interurban articles that has been appearing in "Brill Magazine" seems to indicate that the handling of freight is of ever-increasing importance to the average interurban railway. On many roads it forms the backbone of the business and helps tide over the lean spots in the year; to nourish this freight business would accordingly seem to be a good plan.

TWENTY CARS FOR WILKES-BARRE & HAZLETON RAILWAY AND LEHIGH TRACTION COMPANY

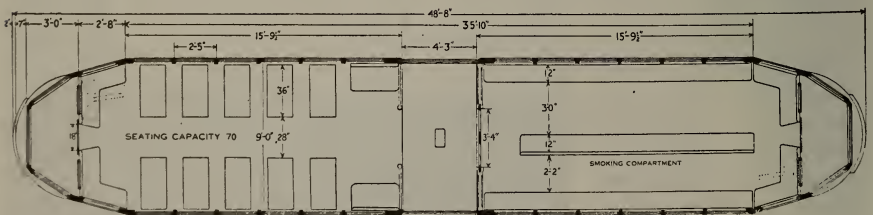
BRILL 27-M. C. B. TRUCKS

THE J. G. Brill Company has completed and shipped to the Lehigh Traction Company, of Hazleton, Pa., ten all-steel center-entrance, double-truck cars and has finished for the Wilkes-Barre & Hazleton Railway Company ten all-steel passenger and baggage cars, also mounted on double trucks. Each of these types represents the latest word in the carbuilder's art. They embody the most modern principles of car design and the best results of careful experimentation by highly competent engineers. That this is so is shown by the splendid appearance of the cars; they speak for themselves.

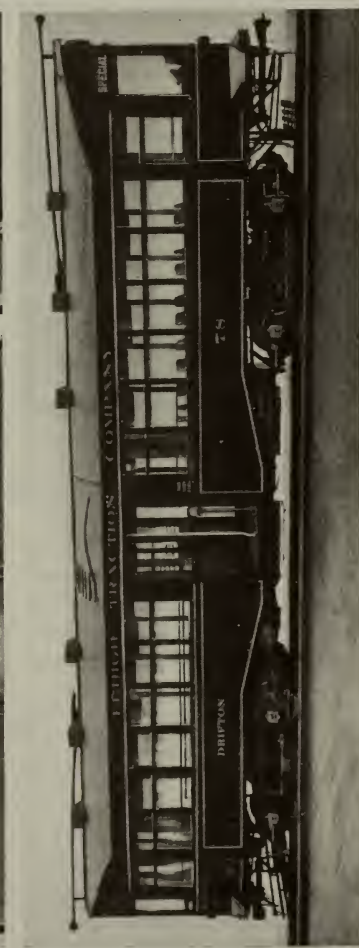
The two companies—the Lehigh Traction Company and the Wilkes-Barre & Hazleton Railway Company—are controlled by the Wilkes-Barre & Hazleton Railroad Company, which owns ninety-two per cent. of the stock of the former and all of the stock of the latter, but which is not an operating com-

pany. The Lehigh Traction Company operates out of Hazleton, connecting that city with West Hazleton, Hazleton Heights, Jeanesville, Audenreid, McAdoo, Milnesville, Lattimer, Ebervale, Jeddo, Drifton and Freeland. The longest of these distances is from Hazleton to Freeland, nine miles; to McAdoo is six miles and Hazleton to Milnesville five miles, making a total, including the run from Hazleton to West Hazleton, of twenty-three miles of track in operation by the company.

A very effective appeal to human interest and public fancy was made by the company's decision to paint the cars with the names of the most important towns through which the lines operate. This was done also in the case of the cars for the Wilkes-Barre & Hazleton Railway. Still another appeal was made by placing on exhibition at Broad and Wyoming Streets, in the business center of Hazleton, the



WILKES-BARRE AND HAZLETON AND LEHIGH CARS. Height from underside of side sills, over trolleyboards, 8 ft. 10 in.; height from floor to center of headlining, 7 ft. 11½ in.; track to step, 15 in.; step to platform, 13½ in.; platform to floor, 10 in.; weight of carbody without electrical equipment, 19,889 lb.; weight of electrical equipment on body, 1734 lb.; weight of airbrake equipment, 877 lb.; weight of trucks, 14,400 lb.; weight of motors, 7600 lb.; total weight, 44,500 lb.

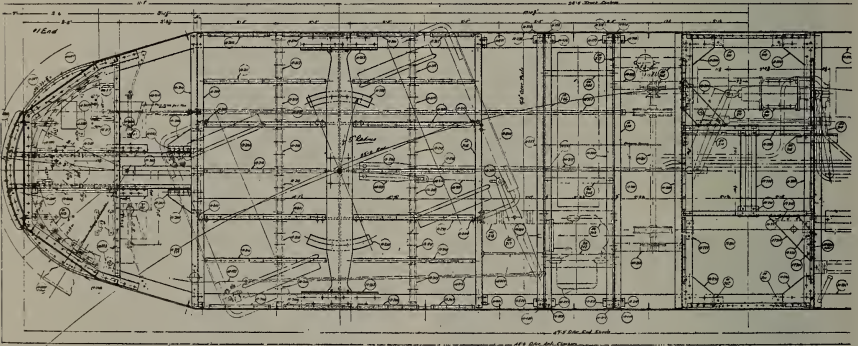


WILKES-BARRE AND HAZLETON AND LEHIGH CARS. The views shown are of the center-entrance cars built for the Lehigh Traction Company. These cars will be used a great deal by miners and one of the best features of the construction and the rules under which they will operate is that the compartment which is fitted with three longitudinal seats will be kept for the exclusive use of the miners so that passengers may ride in the other compartment without fear of dirty seats

first car received. The car was put on exhibition on Saturday afternoon, between one and three o'clock, when the throng of people in the business district is greatest. This car was viewed by the public for two hours and then was put in service on the Broad Street run.

The lines of the company run out to and through towns which have sprung up because of the wealth of anthracite coal around Hazleton. The mining of this coal is of course the chief and practically the only

a seating capacity of forty persons and the car a total capacity of 70, which is a large increase over the capacity of the cars formerly in use, to which equipment the new cars form a supplement and which have a seating capacity of 46 persons. The operating rules governing the use of the compartment form one of the most attractive features of the car. The compartment is reserved for miners and for smokers. Thus, the other compartment will be kept free of



WILKES-BARRE AND HAZLETON AND LEHIGH CARS. These cars, which are of all-steel construction, are meeting with a very apparent public favor

industry of the section. Transportation of miners into Hazleton and back again to their homes and to the mines very naturally forms a large part of the company's business. The design of the car is particularly good for this kind of traffic. One end of the car beyond the center-entrance is enclosed with a bulkhead partition and a pair of sliding doors. This compartment is equipped with longitudinal seats along the sides of the car and with a third seat placed longitudinally in the center of the car. This arrangement gives the compartment

workmen in their dirt-encrusted clothes and the people using it will not be afraid of dirty seats.

The company operates through a territory whose population is sufficient to guarantee a good demand for traffic facilities. Taking Hazleton as the center, from the heart of the city, within a radius of nine miles, this line serves a population of practically 90,000, Hazleton having a population of 33,000; Freeland, 15,000; McAdoo, 10,000, and Lattimer, 3,000. One of the biggest features aiding the company in boosting the demand for



WILKES-BARRE AND HAZLETON AND LEHIGH CARS. These cars will be used by the company on its interurban service between Hazleton and Wilkes-Barre. They are designed for the high-speed service to which they will be subjected

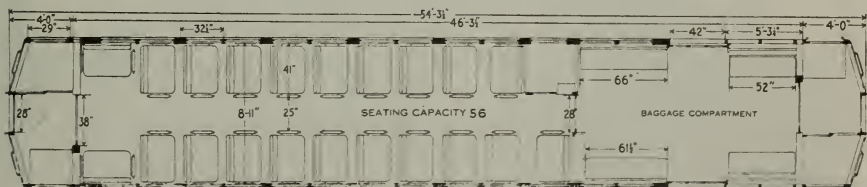
transportation is Hazle Park, a well-equipped amusement park which draws large crowds during the park season and which is owned by the company.

The cars are mounted on Brill 27-M. C. B.1 trucks. They are built on all-steel underframes in which side sills of 6 by $3\frac{1}{2}$ by $\frac{5}{16}$ -in. angle are used, with the long leg horizontal. At the bolster this side sill is reinforced with an angle of 6 by $3\frac{1}{2}$ by $\frac{5}{16}$ by 30-in. steel to relieve the strain on the horizontal leg of the sill angle. The crossings are of $\frac{1}{8}$ -in. pressed steel riveted to the side sills. The bolsters are made of cast steel and are bolted to the side sills. Suit-

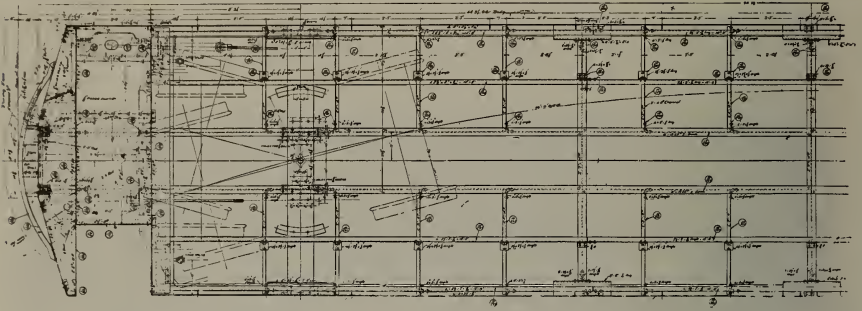
able openings are made in the bolsters for the passage of brake rods, cable conduits, etc. The draft knees are of 4-in. 5.25-lb. channel extending up to the bumpers, which are made of $3\frac{1}{2}$ by $3\frac{1}{2}$ by $\frac{5}{16}$ -in. angle extending the full width of the carbody and projecting 7 in. from the face of the vestibule. The bumper shield is of sheet steel.

In the body framing the side posts are $1\frac{1}{2}$ by 2 by $\frac{3}{16}$ and $\frac{1}{4}$ -in. tees. The belt rail is of 3 by $\frac{1}{2}$ -in. steel and the top rail of $2\frac{1}{2}$ by $2\frac{1}{2}$ by $\frac{1}{4}$ -in. angle. The side sheets are of $\frac{3}{32}$ -in. steel. The rafters supporting the Brill Plain Arch Roof are U-shape.

The cars for the Wilkes-Barre &



WILKES-BARRE AND HAZLETON AND LEHIGH CARS. Height from track to underside of side sills, 3 ft. $7\frac{7}{8}$ in.; height from underside of side sills over trolleyboards, 9 ft. $4\frac{1}{2}$ in.; height from floor to center of headlining, 8 ft. $3\frac{3}{4}$ in.; track to step, 17 in.; step to platform, three steps, $11\frac{1}{8}$ in. deep; weight of carbody without electrical equipment, 36,500 lb.; weight of electrical equipment, 3842 lb.; weight airbrake equipment, 1950 lb.; weight of trucks, 22,600 lb.; weight of motors, 17,040 lb.; total weight, 81,932 lb.



WILKES-BARRE AND HAZLETON AND LEHIGH CARS. The cars are mounted on steel underframes designed to keep the weight of the car within a reasonable limit

Hazleton Railway were shipped to the company on their own wheels, being sent over the tracks of the Pennsylvania Railroad to Nanticoke and thence over the tracks of the Central Railroad of New Jersey to Ashley Junction, where they

were delivered to the railway company, the lines of the company connecting with the tracks of the railroad at that point. These cars are for service between Hazleton and Wilkes-Barre, a distance of thirty miles. The stations served



WILKES-BARRE AND HAZLETON AND LEHIGH CARS. The seating plan of the car brings into the main passenger compartment, whose capacity is 42 persons seated, cross seats exclusively, with the exception of two longitudinal seats at the end of the compartment



WILKES-BARRE AND HAZLETON AND LEHIGH CARS. This compartment, built to accommodate baggage and smokers, has a seating capacity of 14 persons, placed on longitudinal slat seats. The feature of the smoking compartment tends to aid public favor

en route include West Hazleton, Hazle Park, Conyngham Pass, Kisllyn, Drums, Beisels, St. Johns, Nescopeck Pass, Albert, Blytheburn, Pine View, Nuangola Tunnel, Sugar Notch, Ashley and Georgetown. For the run the express cars require but forty-five minutes and the locals one hour. The territory served includes some of the prettiest scenery in this section of the country. Also, among the stations of the company are several which are very popular with picnickers and campers. Among these are St. Johns, Blytheburn and Nuangola. At both Nuangola and Blytheburn there are large lakes which draw many people to their

cool shores in the hot summer season. Many cottages are located along the line and the owners of these cottages commute to Hazleton or Wilkes-Barre, a city of 80,000, during the vacation season.

The Brill 27-M. C. B. 3X truck was selected as the proper type for this car. In the steel underframe upon which the car is mounted side sills of 5 by 3½ by 5/16-in. angle extend the full length of the car, secured to 7-in. 15-lb. I-beam crossings and to 6-in. 8-lb. channel end sills. At the baggage doors these side sills are reinforced properly to take care of the strain that may be thrust upon the sills due to the cutting away of the side girders.

SEMI-CONVERTIBLE CARS FOR CONNECTICUT COMPANY

ALL-STEEL CONSTRUCTION

FOR urban service on its divisions in New Haven and Hartford, the Connecticut Company has purchased from the Wason Manufacturing Company, of Springfield, Mass., forty-six all-steel semi-convertible cars. These cars were purchased with the ob-

without the electrical equipment—of less than 17,000 pounds. The cars as finished came well within this limit, the carbody weight being 16,174 pounds. This weight is of particular interest when the large seating capacity—48 persons—is taken into consideration. This car



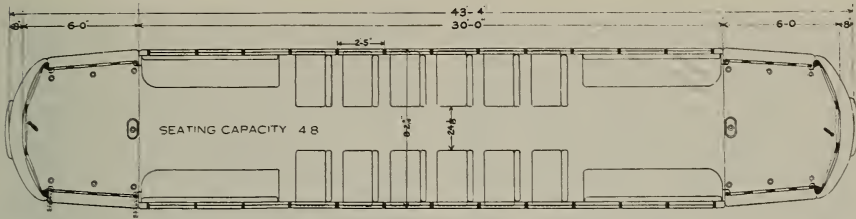
SEMI-CONVERTIBLES FOR CONNECTICUT COMPANY. These cars are for use on the city divisions of the company in New Haven and Hartford. They are to supplement the equipment now in use by the company

ject of supplementing the present equipment of the company. Their use marks the debut of the Pay-As-You-Enter system on the lines of the company, the method of fare collection in the past having been solely by the conductor passing through the car. Naturally the effect of the inauguration of the P. A. Y. E. system by this company will be watched with a great deal of interest.

One of the features of the design of this order is the lightness in weight of the cars, the specifications calling for a carbody weight—

illustrates as well as does any previous order the entire practicability of building a steel car that will stand up under the required service, and still have it well within the bounds of a reasonable weight limit.

The cars that will be operated in New Haven will be subjected to somewhat different conditions from those that will govern the operation of the cars in Hartford. In the former place, a city of 140,000, the cars will be operated on five- and ten-minute headways, and those in Hartford, whose population is



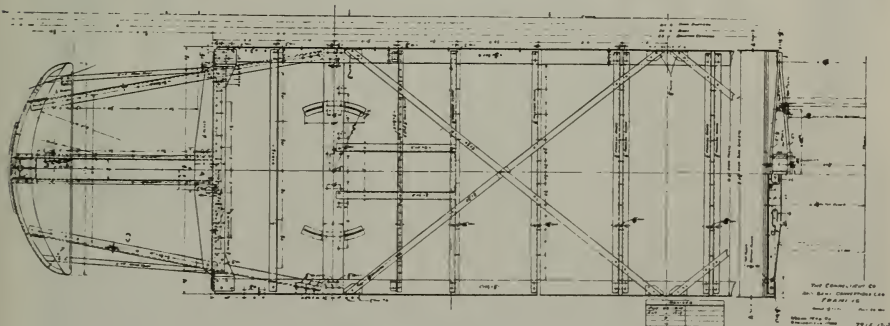
SEMI-CONVERTIBLES FOR CONNECTICUT COMPANY. Height from track to underside of side sills, 2 ft. 11 $\frac{1}{2}$ in.; height from underside of side sills over trolley boards, 8 ft. 8 $\frac{1}{2}$ in.; track to step and step to platform, 14 in.; weight of carbody without electrical equipment, 16,174 lb.; weight of electrical and airbrake equipment without motors and without airbrake equipment other than cylinder, 1776 lb.; weight of trucks, 10,500 lb.; total weight, without motors, 28,450 lb.

25,000 less than that of New Haven, on schedules with ten- and fifteen-minute headways. In New Haven the average speed is from eight to ten miles an hour and in Hartford eight to nine miles an hour, depending upon the lines upon which the cars are operated, the necessary number of stops, density of traffic and other conditions. In New Haven practically all the lines converge at Church and Chapel Streets, and in Hartford the densest traffic point is at City Hall. In the summer season travel to the shore resorts has a very decided effect upon the operation in New Haven. This additional demand for service is notice-

able particularly in the evenings and on Saturday afternoons and Sundays. This condition, however, does not apply to Hartford.

In New Haven approximately 160 closed cars are sufficient to maintain the operating schedules of the company, but in summer—when the type of car is changed to the open car—it is necessary to put on fifteen more cars, bringing the total up to 175.

In the new car the combination of cross and longitudinal seats plays an important part in the handling of the passengers. The distribution of the load is exactly even, there being six cross seats on each side of the car, making a total



SEMI-CONVERTIBLES FOR CONNECTICUT COMPANY. These cars form a good example of the possibility of keeping cars light and yet making them strong enough properly to stand up under hard service. They come well under the specified carbody weight of 17,000 pounds

of twenty-four passengers that may be accommodated on the cross-seats. The other twenty-four passengers are taken care of by the longitudinal seats, placed one at each corner of the car, each seat covering three windows and being long enough for six passengers.

The passengers enter at the rear, by the door farthest from the car-body. The front of the car, also equipped with double doors, is used for exit only. The longitudinal seats at the ends of the car form a good combination with this system of loading and discharging.

They provide extra standing room where it is most needed. The progress of an unusually heavy incoming load will not become clogged, as the passengers, having paid their fares, step directly into a space which furnishes them with plenty of room. Those of the passengers who are going but a short distance may stand in this wide space at the rear, and leaving, use the rear door. The tendency of the passengers who intend to travel a longer distance naturally is to seek a place on one of the cross seats. Thus they pass up the aisles between the cross



SEMI-CONVERTIBLES FOR CONNECTICUT COMPANY. The cars are equipped with the Brill Semi-Convertible window system, the sashes being arranged in tandem form and designed to raise into pockets in the roof of the car

seats and those who fail to find a cross seat go still farther forward and stand in the space between the longitudinal seats, using, as they leave, the front exit doors.

In each side of the car there are twelve windows. Of these twelve windows the center two are different from the other ten. Across the tops of these two center windows is a continuous stationary glass for the purpose of displaying destination signs, and the sashes below this glass are arranged to raise about five inches. The other ten windows are equipped with Brill tandem sashes.

In the underframes, side sills of 6 by $3\frac{1}{2}$ by $\frac{3}{8}$ -in. angles are used. These side sills are connected at the ends by end sills composed of $\frac{1}{4}$ -in. plate bent Z-shape, the two horizontal dimensions 7 and 5 in., and the vertical dimensions 9 in. By means of this form of end sill the platforms are slung 9 in. below the level of the car floor, which has a 3-in. ramp from a point 4 ft. toward the center of the car from the end sills, the point at which the bolster falls in this underframe. Thus, although the car floor is kept fairly high (the height of the underside of the side sills meas-

uring 2 ft. $11\frac{3}{16}$ in. from the track, which height causes the flooring to be laid $39\frac{1}{16}$ in. above the track), the floor of the platform measures but $28\frac{1}{4}$ in. above the track, which height makes possible a comfortable ascent to the car through the use of a 14-in. step.

The platforms are supported on outside steel knees of 7 by $3\frac{1}{2}$ by $\frac{1}{4}$ -in. angle, running diagonally from the side sills, to which they are riveted at a point about $3\frac{1}{2}$ ft. in from the end sills, to the 7-in. 9.75-lb. channel bumper, being bent down under the end sill and reinforced in the bent portion of their length by 2 by 2 by $\frac{3}{8}$ -in. angle. The center platform knees are of 4-in. 5.25-lb. channel placed 8 in. apart. Also, outside of the outside steel knees are placed 2 by 9-in. wooden joists. Each way from the center of the car to the bolster there run diagonal braces of $2\frac{1}{4}$ by $\frac{1}{4}$ -in. steel plates. The crossings are of 3 by 3 by $\frac{1}{2}$ -in. angles and $\frac{1}{8}$ -in. pressed shapes, whose deepest dimension is 5 in., oak crossings, $11\frac{1}{4}$ by $3\frac{1}{16}$ in., being used to supplement the latter. The bolsters are made up of a top plate of 8 by $\frac{3}{4}$ -in. steel and a bottom plate of 8 by 1-in. steel.

Statistics gathered from street railway operation in Kansas City, based upon a comparison of the conditions that existed before the near-side stop plan was put into effect with present-day conditions, show that on most of the runs the average schedule speed has been increased by about one-half mile per hour—which means, of course, a decrease in time lost and an increase in net earnings.



EIGHTY CARS FOR CLEVELAND

FRONT-ENTRANCE, CENTER-EXIT

THE Cleveland Railway Company has purchased from the G. C. Kuhlman Car Company eighty front-entrance, center-exit, prepayment and postpayment cars, which are exact duplicates of an order for fifty cars built for the company the middle of last year and described in an article published in BRILL MAGAZINE for August, 1915. The order for the fifty cars built in 1915 was placed after extensive experimental operation by the company, with the result that the type attained immediate and unquestionable popularity. Public demand for the type was apparent from the first, and the increase in popular favor resulted in the purchase of the eighty new cars just delivered to the company. In addition to this proof of the advantages of operation with this car, the company has rebuilt fifty of its double-end, composite underframe wooden cars into the new type. This work was done in the new repair shops of the company. Twenty-five of the cars that

were selected for conversion were of a type placed in service in 1908 and twenty-five others were put in service in 1898.

The advantages of this type of car have been so apparent from the outset that the public requested the company to install more of them. They have been found to be very popular with the trainmen operating them, and the transportation department has experienced greater ease in the making of schedules. To Peter Witt, former street railway commissioner for Cleveland, belongs the credit for the general arrangement and fare-payment system, Mr. Witt having consulted widely with the motormen and conductors on the company's lines.

The cars are mounted on Brill 51-E1 trucks and are built on steel underframes with a box-girder for the center member. This girder is composed of a pair of channels with top and bottom plates and provides the strength necessary to allow for the interruption of the members at the center exit.

AUTOBUSES FOR PENINSULA RAPID TRANSIT COMPANY

OPERATED ON EASTERN SHORE OF MARYLAND

THE Peninsula Rapid Transit Company, of Salisbury, Maryland, recently purchased from The J. G. Brill Company seven autobuses for operation in and around Salisbury. Two of these buses measure 15 ft. 10 $\frac{3}{4}$ in. over the corner posts, are equipped with rear platforms and designed so as to give them a seating capacity of 26 persons; the other five, built for operation by driver only—with but one door, at the front—measure 14 ft. over the corner posts and have a seating capacity of 18 persons. The company has offices at Salisbury and also at Princess Anne, Md., both of which are on the Delaware Division of the Philadelphia, Baltimore and Washington Rail-

road. The buses are distributed about equally between city service in Salisbury and interurban service to towns near Salisbury.

For its city service the larger bus was selected by the company, the platform at the rear giving, with the exit at the front, a good combination tending to do away with congestion. The rear platform aids in increasing the seating capacity of the car, a wooden seat placed on it being designed to accommodate six persons.

It was decided by the company that the best way to appeal to public favor was to institute a city service as nearly as possible similar to the service of the average trolley cars. The conductor stands at the



BUSES FOR PENINSULA RAPID TRANSIT. This bus, built with a rear platform, is intended for operation by a driver and conductor



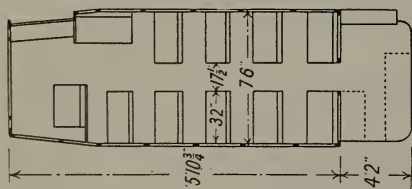
BUSES FOR PENINSULA RAPID TRANSIT. This bus has been selected by the company for its operation in the towns around Salisbury, the two-man operation being depended upon to reduce time lost in stops

rear of the bus and collects fares as the passengers enter, thus saving time because the bus may be started without waiting to make change or give transfers. Ordinary passenger loads can be handled by the rear platform with perfect ease, the driver starting the bus as soon as the passengers are aboard and the passengers then

moving into the bus as they pay their fares. For the rest of its seating arrangement this bus is provided with five transverse seats on the left-hand side and with four transverse seats on the right-hand side and also with a longitudinal seat placed at the front of the bus on the right-hand side next to the folding door.

Seven windows are placed on the left-hand side of the bus and six on the right side. These windows are provided with double sashes, the top sash stationary and the lower sash arranged to drop. The rear end of the bus is provided with two windows, located one on each side of the single sliding door.

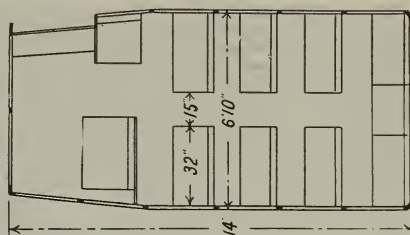
The side posts of the bus are of



BUSES FOR PENINSULA RAPID TRANSIT. Height from top of floor to ceiling, 6 ft. 6 in.; wheel-base of chassis, 163 in.; seating capacity, 26; weight on chassis complete, 10,440 lb.

ash $1\frac{3}{8}$ in. thick. They are built with a sweep of $2\frac{1}{2}$ in. The body framing is built entirely of ash and long-leaf yellow pine, the panels throughout being of poplar. A plain arched roof extends over the front and also over the rear platform.

The other bus will be operated between Salisbury and Fairmount; Salisbury and Fruitland, the next station to the south; Salisbury and Delmar, the next station above Salisbury and one of Delaware's most prosperous towns; and from Salisbury due east to Berlin, on the Franklin City Branch, and thence to Ocean City, Maryland, next seashore resort below Rehoboth and one of the most popular along this part of the Atlantic seaboard. Competition from trolley lines is



BUSES FOR PENINSULA RAPID TRANSIT. Height from floor to roof carlines, 6 ft. 6 in; seating capacity, 18; weight on chassis complete, 6900 lb.

nowhere encountered; in fact, this bus service very likely will be the means of developing a demand for transportation that will attain the size of an electric line, thereby providing another step in the progress of the state.

At the front of the bus there is a two-leaf folding door which is operated by the driver from his seated position on the left-hand side of



BUSES FOR PENINSULA RAPID TRANSIT. These buses are for use in and around Salisbury, on the eastern shore of Maryland



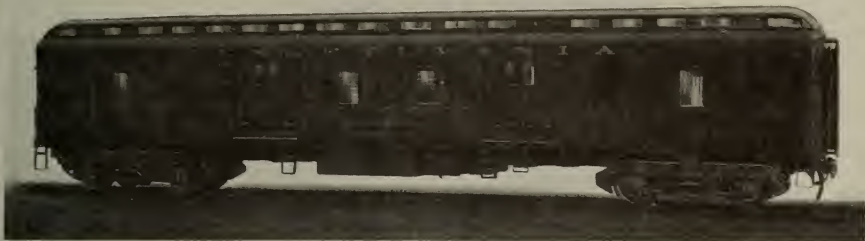
BUSES FOR PENINSULA RAPID TRANSIT. The cross seat at the rear of this bus helps in increasing its seating capacity

the bus, the door opening out. At the rear of the bus there is an emergency door, arranged so as to be operated by the passengers.

In the body framing of the bus the ash side posts $1\frac{3}{8}$ in. thick are

given a sweep of 2 in. The body framing throughout is of ash, the side sheathing of aluminum. The side sills, end sills and crossings are of white oak. This bus is also provided with a plain arched roof.

There seems to be a tendency—due, in the main, to oversight—in many cities to allow the equipment that is shunted off onto the crosstown or shuttle lines equipment to become worn and shabby—to go to seed. Perhaps in no case is this intentional; the importance of keeping public favor for these crosstown lines at a high pitch momentarily has been overlooked and the fact that faded, shabby equipment does not create more demand for the service has been lost sight of.

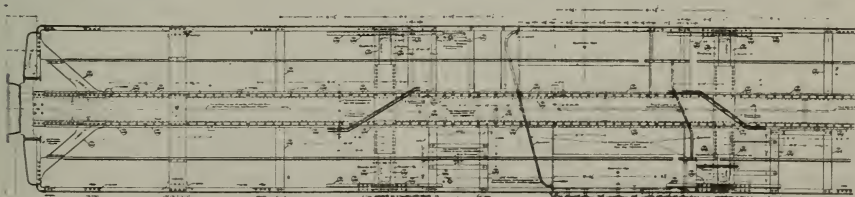


BAGGAGE CARS FOR PENNSYLVANIA RAILROAD

ALL-STEEL, 35,000-POUNDS CAPACITY

THE Pennsylvania Railroad shortly will install on its lines the last of fifteen new 60-ft. all-steel baggage cars built by The J. G. Brill Company. These baggage cars are exactly like an order for twenty-four cars which was placed with the Brill Company the latter part of December and which is at present in the process of building. The cars are standard with the company, all the details of design of both underframe and body construction being the same with all cars of this type; the staff of engineers of the railroad company is responsible for the design in its entirety. The cars are mounted on trucks built by the Brill Company, the type being the Pennsylvania No. 7 truck.

Of the first order—fifteen cars—eight are to be used on the divisions of the Pennsylvania east of Pittsburgh; one car of the order will be put in service on the Northern Central, a Pennsylvania subsidiary operating from Baltimore to Harrisburg and Williamsport and terminating at Sodus Point, on Lake Erie; two of the cars will be used on the Philadelphia, Baltimore and Washington, another subsidiary, whose divisions include the Maryland, Delaware and Media; the other four cars are labelled with the ownership mark of the Western New York and Pennsylvania, which operates from Buffalo along the shore of Lake Erie to Brocton, N. Y., where it turns south to Pittsburgh.



BAGGAGE CARS FOR PENNSYLVANIA RAILROAD. Length overall, 64 ft. 3¼ in.; extreme width, 10 ft. 11½ in.; height from track to underside of side sills, 3 ft. 7½ in.; height from underside of side sills over roof, 10 ft. 5 in.; weight of carbody complete, including electric lighting and airbrake equipment, 69,300 lb.; weight of trucks, 31,300 lb.; total weight, 100,600 lb.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

A SPRAINED DISPOSITION

"**A** RAG and a bone and a hank of hair"—let us juggle with the immortal Kipling for a moment, all the time looking at the world through the dark glasses of the confirmed pessimist, and we get "A grunt and a groan and a life that's bare." Surely the song of a fool in each case. The first sprained his morality and let it go unattended until he slid into an agonized tomb; the second sprained his disposition and left it undoctored and finally he became that thing which is the most unnecessary of human afflictions—a grouch. It would be hard to say which fared the worse—Fool No. 1, who lived his life all too unwisely and entered a premature grave, or Fool No. 2, who has doomed himself to trudge endlessly, tragically through life—a confirmed pessimist—never seeing the light of happiness, never feeling the warm touch of hope, ambition, inspiration, enthusiasm, but digging blindly, sullenly like a mole at the obstacles his self-imposed affliction has raised before him. The moral is easy—if you sprain your disposition, take a chance on breaking your leg in your wild rush to old Doctor Optimism.

THE MAN-COW

THERE is prevalent among the ranks of platform men—although to a decreasing degree—the man who imitates a cow—the chewer. Disgusting as it is to sit in a trolley and watch the jaws of motorman or conductor wagging incessantly like the cud-pounding bovine, it is still more disgusting to see these man-cows open a window or a door and launch into the great out-of-doors a stream of tobacco juice. There are men who still are victims of this vile habit, despite the effort of the large majority of railway companies to correct the fault. There are conductors who open their windows to squirt their little liquid horror every time they ring up their fares in leaving a street corner; there are motormen who open their doors at least once to every block to expectorate. It is true that they may never hit anyone; their disgusting habit may never precipitate a suit for damages; but it is also very true that there is a certain class of people—fortunately the largest class—who are so disgusted at the sight of these cud-chewers that they would rather walk some distance than ride in a car operated by such human beasts. It is a bestial habit and one that is inexcusable because it is not very hard to break.

PLAINE COMMUNSENS, M. D.

COR. GOOD CONDITION AND
HEALTH AVENUES

PHONE: HAPPINESS 1916

OFFICE HOURS
A. M. AND P. M.

For Mr. Office Man:

- R** 1. Five minutes calisthenics before breakfast.
2. Walk to office from home.
3. Walk home from office.
4. Gymnasium or outdoor sports as often as practicable.

Mix thoroughly with light breakfasts and luncheons and sensible dinners, and take daily until relieved of flabbiness about the mid-section; then increase the fourth component in direct ratio as muscle and health increase.

Plaine Communsens, M.D.

THE SHOW-OFF

SOMETIMES there is noticeable in a platform man a quality badly in need of curbing—that is, a spirit of bravado. Especially is this true with the young man—perhaps the man young in years but more often the man young in his company's employ. In the case of the former he simply hasn't grown up; the boyish, animal spirit is still predominant. In the case of the latter the man's better judgment is overshadowed by a desire to show off, to impress his crewmates with his fearlessness or, worse yet, with his recklessness. Often this fellow—this show-off—may be seen taking risks that might easily result in terrible accidents; jumping on or off rapidly moving cars; willfully ignoring safety cautions and devices; taking chances that may result disastrously. In many cases this spirit of bravado is due to a desire to display perfect knowledge of the job; it shows just the opposite—the ignorance of the risks that are being taken. An amputated foot or leg or hand, which surely will follow continued foolhardiness of this sort, without doubt will teach this fellow his lesson if he doesn't learn it sooner. Besides the pain he may have to bear to learn his own safety

alphabet, there is to be considered the example he is setting the patrons of his company, or the growing boys playing in the streets. Injury to one of these, sustained as a result of imitation of this man's antics, should be traceable to him and punishable just as surely as would be wilful assault. He is put beneath a uniform cap to safeguard the service of the company—to protect the lives of his patrons, not to jeopardize them.

Familiarity often can be mistaken for friendship; be sure you know the dividing line.

THE HOUSE

A MAN one day awoke to the realization that he had a faithful servitor whose recognition by a suitable gift would be very appropriate. This servitor was named Perpetual Happiness. Accordingly, the master decided to build him a house.

He began by engaging Genius as the architect. Genius drew up the plans with astonishing promptness and when finished they showed great versatility.

Then the Man let the contract to the best contractor in the world—Confidence. Confidence bought his lumber, his cement, his brick and his stone from Stability. Then he turned to Energy to furnish the necessary labor and to Resolution to lay the foundation.

The foundation laid, Honesty erected the walls and Confidence began to look about for someone who would furnish one of the most vital parts of the structure—the girders. He found Character.

Lastly, with the foundations laid staunch and true, the walls built to stay and the girders properly designed and installed, Reputation, the famous decorator, was consulted and the building was given its final touches.

And when it was all done the Man found that there was more room in the house than he had thought, and so he moved into it himself and lived there with his friend Happiness.

The chap who continually talks turkey necessarily will have food on his table.

CHANGES OF ADDRESS

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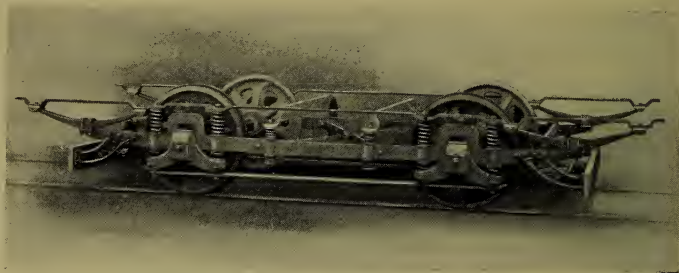
AUSTRALASIA—Noyes Brothers, Melbourne, Sidney, Dunedin, Brisbane, Perth

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NATAL, TRANSVAAL AND ORANGE RIVER
COLONY—Thomas Barlow & Sons, Durban, Natal

ITALY—Giovanni Checchetti, Piazza Sicilia 1, Milan



BRILL 21-E TRUCK

FEW passengers ever give a thought to what is under the cars in which they ride. They know that the car runs on wheels and that the wheels are in some way connected with the body, but they haven't the ghost of a notion that the dirt-covered mechanism under the car concerns their welfare. The public is totally unaware that the car truck is of such tremendous importance to its safety, comfort, health and wealth that it has been developed into the most marvelously scientific spring-cushioned load-carrying device in the world. Railway managers know, however, how fundamentally vital smooth-riding and quiet-running car trucks are to good service, and see to it that they are provided. Master mechanics know that of all trucks the long truck for four-wheel cars has the most difficult part to play and must be given the longest and steadiest wheelbase possible. To have a correct spring system a truck must have
solid-forged side frames.

THE J. G. BRILL COMPANY, PHILADELPHIA

BRILL MAGAZINE

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BRILL DEDENDA GONG

JUST how it is that there can be no chattering sound produced from the Dedenda Gong, either by carelessness or design, may be seen readily by examination of the illustration. The pedal in the picture is pushed down as far as it will ever go—it is the momentum given by a quick thrust on the pedal, assisted by the weighted part of the clapper, which carries the latter into sharp contact with the gong. Immediately after the contact, the weighted end of the clapper again figures in the operation, producing a quick rebound which prevents any possibility of continued contact with the gong and the consequent disagreeable chattering sound. A half-turn of the pedal locks it down when not in use. The view on the right shows the pedal locked. A slot in the head of the pedal makes it possible to insert a switch-bar with which to twist it, should it become clogged with mud or ice.



George Kidd

GENERAL MANAGER, BRITISH COLUMBIA ELECTRIC RAILWAY COMPANY, LTD.

Service and Recompense

Electric railway and power companies, together with most other public service corporations on this continent, are passing through a difficult time. The days have gone past when a public company, secure in its charter rights and the protection of the courts, could afford to ignore public opinion as expressed by the popularly-elected bodies. Control and regulation by state and municipal bodies are now accepted principles, and such bodies are perhaps inclined to exercise their new powers with too much regard for the views of the people by whom they are elected and too little regard for the investors whose enterprise has built up the public service company.

If the idea of "Service" is to continue to be the main object of the public company, there must be the idea of "Sufficient Return on Investment" as a controlling principle in the minds of the regulatory bodies in their dealings with the companies.

I believe the general sense of fairness which always ultimately prevails in enlightened communities will eventually adjust the balance properly between the needs of the people and the rights of the investors, but the period of transition from the old state of things to the new may be a very trying time for many companies, and it is important that officials of public companies should, while doing all they can to please the patrons of the utility, also lose no opportunity of pressing for fair treatment for their investors.

GEORGE KIDD.

APRIL 15, 1916

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GEORGE KIDD

GEORGE KIDD was born in Sheffield, England, March 9, 1874. His education was received at the Lincoln Grammar School, and after leaving that institution he accepted a post with Mellors, Basden & Mellors, chartered accountants, of Nottingham, England. He remained in this line of work until 1907, when he made his first connection with the electric railway business, accepting the position of Secretary of the British Columbia Electric Railway Company, Ltd., having his offices in London, England. Later he was made comptroller of the company and removed to Vancouver, British Columbia, to take charge of his affairs there. This position he held until May 6, 1914, when he became General Manager of the Company, which post he now holds. Mr. Kidd is a member of the National Electric Light Association, the American Electric Railway Association and of the Canadian Electrical Association.

INTERURBAN CENTERS AND INTERURBAN CARS

VANCOUVER



BRITISH COLUMBIA'S commercial metropolis, Vancouver, in the words of Earl Grey, "the recognized gateway between the east and the west,"

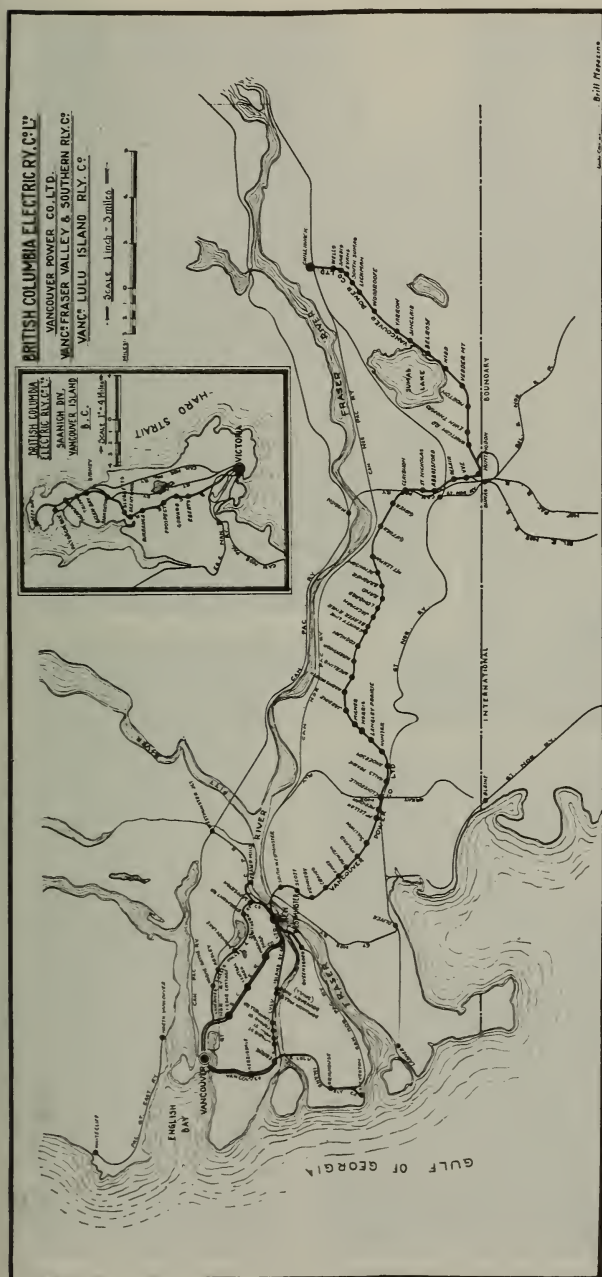
is situated on the Pacific Coast, of Canada, in a commanding position on a peninsula formed by the Fraser River and Burrard Inlet. To the south may be seen the waters of the Fraser River, to the west the Gulf of Georgia, and to the North Burrard Inlet and the main harbor, and beyond this the younger sister city of North Vancouver and the mountains of the coast range. This situation is a strategic one as the city is the terminus of four trans-continental lines of railway and the home port of the Canadian Pacific Railway Royal Mail Steamships to China and Japan, and the Canadian Australian Royal Mail Steamships to Australia and New Zealand.

Vancouver was incorporated in 1886 and is a young city of rapid growth. The population in 1893 was 16,000, and now the number in Greater Vancouver is estimated as more than 150,000. In the summer months the bathing beaches of Vancouver are a daily source of pleasure to all; they are situated close to the best residential sections

and reached easily and quickly by electric car. Stanley Park, which comprises a thousand acres of primeval forest, is also within a few minutes of the centre of the business district of Vancouver, with electric cars running to the entrance. The electric car service of Vancouver and its surrounding territory is furnished by the British Columbia Electric Railway Co., Ltd.

The sister city, North Vancouver, is placed with a southern exposure facing Vancouver itself, to which there is a frequent service of ferries. By electric car can be easily reached the canyons of the Capilano, Lynn and Seymour Creeks, which are among the scenic wonders of the world.

New Westminster, a city of 15,000, is reached in 45 minutes from Vancouver by three inter-urban electric railways. This city is situated on the Fraser River, is an important fresh-water port, and has many points of interest, including a million-dollar bridge spanning the river, great lumber mills (one of them the largest in the world) and a number of salmon canneries. Salmon canneries are also to be seen at Steveston, at the mouth of the main arm of the Fraser River. This is the principal centre of the fishing industry in British Columbia and is also easily reached by interurban electric car from Vancouver and New Westminster.

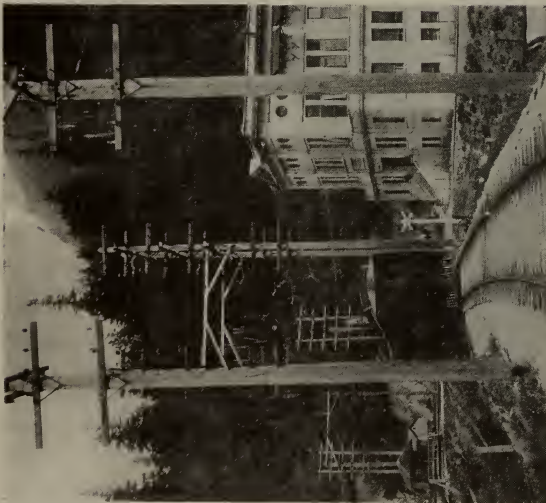


The city of Victoria, situated on Vancouver Island, is the seat of government and the capital of British Columbia. It is the oldest city in the Province, dating back to 1846, when it was known as Camosun, a Hudson Bay Company's trading post. The city leaped into prominence during the gold excitement in 1858 and grew rapidly in trade and population. Its population is estimated at 40,000. The street car service in the city is operated by the British Columbia Electric Railway, as is also an interurban line known as the Saanich Division, extending for a distance of 23 miles from Victoria to Deep Bay, and running through the fertile lands of the Saanich peninsula.

The interurban system of the British Columbia Electric Railway comprises two divi-



Lake Buntzen Generating Station No. 2
Lake Buntzen Generating Station No. 1



Standard sub-station on Fraser Valley Branch
Vedder Mountain in background
Fraser Valley Branch at Sumas Lake

sions, known as the Interurban Division of the Mainland system and the Saanich Division on Vancouver Island; of the total mileage of track, namely 350.65 miles, owned or operated by this company, 180.48 miles is represented by interurban track-age.



INTERURBAN CENTERS AND CARS. Granville Street Station at Vancouver

On the Mainland, the Interurban Division consists of three lines, connecting the cities of Vancouver and New Westminster, with a branch line crossing the rich farming lands of Lulu Island to the cannery town of Steveston. Another interurban division called the Fraser Valley Line, crosses the Fraser River at New Westminster and runs eastward between the river and the international boundary for more than sixty miles to the town of Chilliwack. The combination of transportation facilities and electric power at low rates has resulted in the location of numerous industries along these interurban lines.

The interurban line connecting the cities of Vancouver and New Westminster was practically the first interurban line to operate in Canada, having commenced service in August, 1891. There is a considerable suburban population along this route. The line is double-tracked all the way, and trains of one or two cars run at twenty-minute intervals, with local trains doubling this service between Vancouver and Central Park dur-

ing the rush hours of the day. Central Park is situated about half way between Vancouver and New Westminster, and it is between Vancouver and Central Park that the heaviest travel prevails. An average of sixteen cars is employed in this interurban service, and the run of 12.5 miles is made in forty-five minutes, with an average of twenty-six stops. About 5,000 passengers are carried daily on this line.

What is known as the Second District is the Interurban Line from Vancouver to Eburne, on the north arm of the Fraser River, and thence to Steveston. This is a branch of the Canadian Pacific Railway which was leased and electrified in 1905. From Eburne there is a connecting line with New Westminster, which forms a second route between the two cities. From Vancouver to Eburne Junction, a distance of 6.6 miles, the line is double-tracked and passes through suburban residential districts. From Eburne this line crosses a bridge over the Fraser River and runs for about 8 miles through the



INTERURBAN CENTERS AND CARS. Combination milk and passenger train, Fraser Valley Branch

Delta lands of Lulu Island, which are remarkable for their fertility and productiveness. At Brighthouse, on this branch, ten miles from Vancouver, is Minoru Park Race Track, to which trains of three to five cars are run at fifteen-minute intervals during the race meets. The branch from Eburne Junction to New Westminster follows the north arm of the Fraser River through market gardens and suburban districts, joining the tracks of the interurban line known as District 1 about half a mile from New Westminster Station. From Vancouver to Eburne trains of one or two cars run at half hour intervals with a fifteen-minute service during the rush-hour periods in the morning and evening, making the trip in twenty-five minutes, with an average of fifteen stops. Beyond Eburne trains run every hour alternately over each branch, giving

a two-hour service to Steveston and New Westminster, respectively. Between Eburne and New Westminster the run of 10.6 miles is made in twenty-five minutes, with about eight stops, requiring a schedule speed of more than twenty-five miles per hour with maximum running speed of forty-five miles per hour.

The third interurban route between Vancouver and New Westminster is known as District 4. For the first 2.7 miles the route taken is similar to that of District 1. At the 2.7 mile point the line turns eastward through the Burnaby district, crossing the Great Northern Railway at Ardley, and skirting the southern shore of Burnaby Lake to Sapperton, which is the eastern suburb of the city of New Westminster, whence the city line is taken for 2.4 miles to the terminal station. The country

through which District 4 runs is only sparsely settled as yet. An hourly service is maintained on this line in the morning and evening and every two hours the rest of the day. The run from Vancouver to New Westminster takes fifty-five minutes, and the 9.6 miles of track outside the cities are covered in twenty-seven minutes, with an average of eight stops.

The Fraser Valley Line from New Westminster to Chilliwack is known as District 3. This line is 63.8 miles long. Leaving New Westminster the Fraser River is crossed on a steel bridge about a mile long owned by the Government of British Columbia and used jointly by the British Columbia Electric, Great Northern and Canadian Northern Pacific Railways. The line then ascends the ridge south of the river, passing through heavily timbered country. After

crossing this ridge the line crosses the Great Northern Railway tracks at the town of Cloverdale, where there is an interchange with that road, and turns back towards the Fraser River, running through Langley Prairie, a rich farming and dairying district. At Abbotsford, 39.3 miles from New Westminster, is a large freight yard with connections to the Canadian Pacific Railway. From this point to Huntingdon, about four miles, many large dairy farms are passed, and at Huntingdon are more interchange tracks connecting with the Northern Pacific, Canadian Pacific and Bellingham & Northern Railways, the latter being part of the Chicago, Milwaukee & St. Paul system.

Leaving Huntingdon the line swings eastward across Sumas Prairie till it crosses the low-lying lands around Sumas Lake on a



INTERURBAN CENTERS AND CARS. Terminal building at New Westminster



INTERURBAN CENTERS AND CARS. British Columbia Electric
Railway's office building at Vancouver

fourteen-foot embankment more than three miles long. These lands are frequently submerged during the summer freshets of the Fraser River, but the rest of the year afford fine pasture land; and an extensive reclamation scheme is being developed to convert the area of 30,000 acres into first-class farming lands. After crossing the Vedder River, the line enters the Chilliwack Valley, which is one of the

New Westminster with the interurban trains operating between Vancouver and New Westminster, the 63.8 miles on the Fraser Valley Line being covered in two hours and fifty-five minutes, and the whole seventy-six miles from Vancouver to Chilliwack in three hours and thirty-five minutes. On the Fraser Valley Line are six regular stops and, with flag stops, the total is about thirty. The total number of

passengers carried on the Interurban Lines during 1915 was 4,022,781, and the passenger car mileage was 1,890,227.

In Vancouver there are two interurban terminal stations. The main terminus is in the heart of the business district and occupies part of the ground floor of the head offices of the company in a handsome building erected



INTERURBAN CENTERS AND CARS. Chilliwack station and
trainshed at eastern terminal of Fraser Valley Line

at a cost of about \$500,000. Trains leave here over two routes to New Westminster, averaging about eighty trains daily. The second Interurban terminus in Vancouver is known as the Granville Street Station and is located near the south end of a bridge across False Creek which forms the entrance to the business district from the southwestern section of the city. From this point interurban trains leave

55 ft. over the bumpers and between 60 and 70 seated passengers.

The main distributing freight yard is in the west end of New Westminster near the junction of the first and second district lines. This yard contains about three miles of storage tracks and a repair track, and will hold more than three hundred cars. Local freight in New Westminster is handled at a freight shed on the river-



INTERURBAN CENTERS AND CARS. Provincial Government bridge over Fraser River at New Westminster

for New Westminster and Steveston via Eburne Junction. The regular daily traffic consists of twenty-three trains and thirty-three locals.

New Westminster is the centre of interurban traffic—here the three inter-city lines and the Fraser Valley line converge. The number of trains departing daily from this point averages eighty-five. The station is close to the business centre of the city and occupies one end of a block fronting on the main business thoroughfare. The passenger equipment of the company averages about 50 to

front near the passenger terminal.

In Vancouver the central freight yard is two blocks south of the passenger terminal and so situated that when business becomes too congested to be handled by entrance over city lines an independent entrance through the railway yards round False Creek can be effected. At present the yard has a capacity of 130 cars, besides storage and yard accommodation for service and maintenance of way equipment, passenger cars, etc.

On the Lulu Island Line, known as District 2, a large part of the



Three-car passenger train—New Westminster to Chilliwack
Interurban car used on Fraser Valley Branch



Milk train, Fraser Valley Branch
Interurban car used—Vancouver to New Westminster

traffic is between the mills and factories around False Creek and the Canadian Pacific Railway yards, and the electrified interchange tracks will accommodate about one hundred cars. Industrial spurs and sidings are numerous all over the system, with yards and freight sheds at all important shipping points.

A feature which is of special interest, particularly at this time, is the intimate relationship which exists between the Interurban system of the British Columbia Electric Railway and the surrounding transcontinental steam railroads. The operation of the interurban system is conducted essentially on steam road lines, particularly with regard to freight, and standard steam road rules are everywhere in force. Freight interchanges are established with steam lines as follows: At Vancouver—two with Canadian Pacific Railway, one with Great Northern Railway; New Westminster—with the Canadian Pacific Railway; Cloverdale (Fraser Valley Line)—with the Great Northern Railway; Abbotsford (Fraser Valley Line)—with Canadian Pacific Railway; Huntingdon (Fraser Valley Line)—with Canadian Pacific, Northern Pacific and Bellingham & Northern Railway; Chilliwack (Fraser Valley Line)—with the Canadian

Northern Pacific Railway; and at Victoria there are freight connections with local lines operated by the Canadian Pacific and Great Northern systems.

The fact that these interchanges exist has been taken advantage of and through rates have been published from almost all points on the British Columbia Electric Interurban system to practically all points in Canada and the United States. The freight revenue forms an increasing proportion of the total revenue, and by means of through bookings on freight there is every prospect of an increasing importance attaching to this side of the business. During the year 1915, 4,238 foreign cars were interchanged, and the total freight tonnage handled over interurban lines was 224,300 and the total freight car mileage was 763,658. Car-load freight is handled by trains daily over each line, in M.C.B. standard cars hauled by locomotives and in



INTERURBAN CENTERS AND CARS. Standard sub-station on Fraser Valley Branch

charge of regular freight crews, in some cases operating at night so as to keep clear of the passenger traffic, and by extra locals to clean up cars and siding when necessary to relieve the through trains. The company's freight equipment, in addition to about thirty locomotives, consists of 192 box cars, 200 flat and logging cars, 22 steel gondolas and 33 miscellaneous rock and gravel cars, besides a number of stock cars and cabooses. Express and light freight is handled on motor express trains, some of which operate on time table, making regular trips. On the short lines an express car makes regular trips over each branch.

The power supply for the electric street and interurban railways and light and power systems of the company on the Mainland of British Columbia is generated for the most part at the company's two Lake Buntzen hydro-electric generating stations situated at sea-level on the North Arm of Burrard Inlet and about 16 miles from the City of Vancouver. The principal storage reservoir for the operation of these plants is Lake Coquitlam;

from this lake water is conducted through a tunnel 12,775 feet long to Lake Buntzen 400 feet above sea-level, thence through pipe lines to the power house. There are two generating stations, one having a capacity of 21,000 kw. and the other 26,700 kw.

Energy from these generating stations is transmitted to the various substations over two two-circuit transmission lines, the more recently constructed lines being supported on steel towers. The two power houses are also tied together by a transmission line. At the present time, the transmission voltage is 34,600, but on the completion of construction of a new transformer station on the outskirts of Vancouver, this voltage will be increased to 60,000. In addition to these generating stations, the company owns a modern steam turbine plant of 13,000 kw. capacity, which is situated in the heart of Vancouver. From these generating stations, the energy is transmitted to the company's substations, which are well distributed throughout the Lower Mainland.

Many interurban railways have interchange freight connection with steam railroads—some with a large number. Of these steam roads perhaps quite a few are large roads—even trans-continentials. It would seem a wise move on the part of the interurbans to publish through rates from practically all points of their system to the most important points reached by the connecting roads, these latter points being selected after careful study of the average trend of the best-paying shipments.

ONE-MAN CARS FOR STONE & WEBSTER

EXTREME LIGHT WEIGHT A FEATURE

ONE of the most remarkable types of cars recently built, and one that is causing a great deal of comment throughout

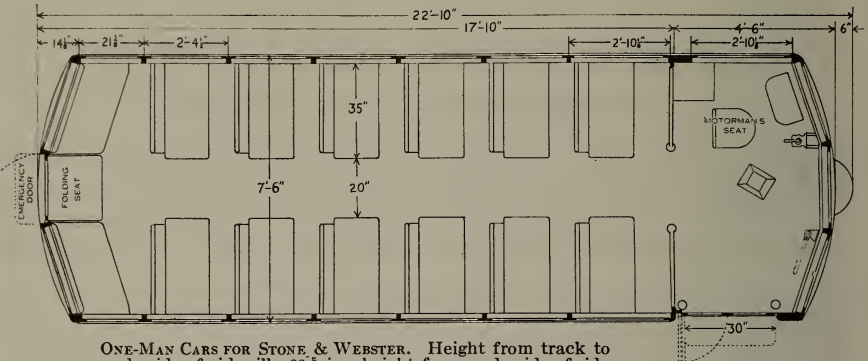
caused a great deal of comment and aroused a great deal of interest in the car. At first glance, until the design of the car and the sub-



ONE-MAN CARS FOR STONE & WEBSTER. These cars are creating comment throughout the electric railway field by reason of their light weight and high capacity. They are mounted on the Brill 78 Trucks

the electric railway field, is that of two 22-ft. 10-in. single-end, one-man, single-truck cars built for Stone & Webster by the American Car Company, of St. Louis. These cars are the result of extended study by C. O. Birney, designer for Stone & Webster, of traffic conditions of cities of various sizes. The remarkably light weight of the car—fully equipped with trucks it weighs under 10,000 pounds—has

stantial manner in which its underframe is built is taken into consideration, it would seem that a car with a seating capacity of 30 persons to weigh but 10,000 pounds would be impracticable. However, the car illustrated has been given an ample factor of safety for the service to which it will be subjected. Its members are designed to give the lightness necessary for the object for which it was de-



ONE-MAN CARS FOR STONE & WEBSTER. Height from track to underside of side sills, 22 $\frac{1}{16}$ in.; height from underside of side sills over trolley boards, 8 ft. 1 $\frac{1}{8}$ in.; height from floor to center of headlining, 7 ft. 4 in.; track to step, 15 in.; step to platform, 12 $\frac{1}{8}$ in.; weight of carbody, less electrical equipment, 4050 lb.; weight of electrical equipment, 2333 lb.; weight of airbrake equipment, 617 lb.; weight of truck, 2966 lb.; total weight, 9966 lb.; seating capacity, 30

signed, and still they are strong and stiff enough to make the car not only safe for its service but to provide also against rapid depreciation. The design of the car has met with such favor that the Stone & Webster Corporation already has

placed with the American Car Company an order for ten more cars.

The car comes into the field at a most opportune time, when appreciation of the economic value of single-truck cars and the one-man

method of operation seems to have become universal, and when the subject of light equipment is being studied by railway managers everywhere. There can be no doubt of the economy of the car—its one-man feature will halve platform costs, the seating arrangement of the car at the same time fostering public favor; and the weight will very materially reduce power and maintenance charges. Recent investigation has shown that the average



ONE-MAN CARS FOR STONE & WEBSTER. The steel underframes upon which these cars were built give the car strength and keep the weight down



ONE-MAN CARS FOR STONE & WEBSTER. The operation of the cars is guarded by an emergency apparatus which controls the braking, sanding, and opening of doors

load of a trolley car during about fifteen hours of each day does not rise above twenty passengers, the capacity loads coming upon the car only during the hours of heavy or rush traffic. Hence, since this average of twenty is well within the seated capacity of this new car, it would seem entirely plausible to get away from the operation of cars of larger capacity, and therefore much greater weight and consequently larger drain upon power and maintenance. To drive a large, heavy car over the lines during the whole day when for a very large part of the day a lighter, much more economical car would

do just as well, would seem to be very wasteful.

The car is built with straight sides, round ends and Brill Plain Arch Roof. The windows are designed with the top sash stationary and the lower sash arranged to raise. The entrance door is placed at the front right hand corner and the platform, which is reached from the ground by means of a folding step, is level with the floor of the car. It is but 27 in. above the track, making entrance easy. At the rear of the car, in the center, there is provided a single emergency door, which is arranged to swing and is operated in conjunc-

tion with a folding step. Inside this door there is a folding seat which makes the capacity of the entire rear seat five persons. This emergency door is fastened by pneumatically- and manually-operated locks. The pneumatic locks, however, are arranged so that in cases of emergency they disengage the door, which then may be opened by the passengers through the means of the manual lock. Thus persons are prevented from entering by the rear door and also they cannot leave by it except in emergencies. Hence, all the leaving and

entering passengers are directly under the sight of the motorman and accidents are guarded against. In addition to the emergency door at the rear, further precautions were taken in designing the car to guard against possible mishaps. Thus in cases of emergency, the power control, the operation of the doors, the releasing of the sand, and the application of the brakes are effected automatically. The controller handle is so designed that should the motorman take his hand from the handle in any position in which the current is flowing

to the motors, the current immediately is cut off by the circuit breaker. This instantaneously causes the operation of a device which opens the front door, unlocks the rear door so that it readily may be opened, throws the brakes on and releases the sand upon the track. Thus it may be seen that the car is made thoroughly safe for one-man operation.

The truck upon which this car is mounted is a new product of the Brill Company, known as the 78 Truck. In this truck, quarter-elliptic springs are combined with coil springs, the system being graduated. There is a



ONE-MAN CARS FOR STONE & WEBSTER. The entrance door is manually operated, and, in case of emergencies, a pneumatic device throws it open

quarter-elliptic spring mounted on each journal-box, the band of the spring resting on the top of the journal box and the inside end of the spring bolted to the bracket or wing which forms a part of the box. The outside end of the elliptic spring is arranged with castings and pins to take care of the transverse swing links supporting a coil spring, graduated for about two-thirds of the seated load of the car. When the car is loaded beyond this point, the coil spring is compressed to such a distance that the castings come into contact and what further load is added comes upon the quarter

elliptics. In addition, at the center of each side frame, there is another coil spring, the top section of which is graduated much after the fashion of the spring arrangement at the farther end of the quarter-elliptics. The lower portion of this coilspring is designed to take care of the same load as the quarter-elliptics and thus it supports a portion of the maximum load.

To take care of the side swing of the car and to keep it from being excessive the truck is connected to



ONE-MAN CARS FOR STONE & WEBSTER. Emergency door at rear of car. It is operated both manually and pneumatically and is automatically released in case of emergency

the carbody through links which are attached at diagonal corners and are located about 12 in. within the wheelbase. These links are of course provided primarily as a mode of connection between the truck and carbody; thus they take the place of ordinary pedestals and spring posts. Also, the play which has to be allowed for in the use of pedestal or spring post connections is done away with and there is practically no lost motion.

Steel underframes are used, the load coming on the side members.



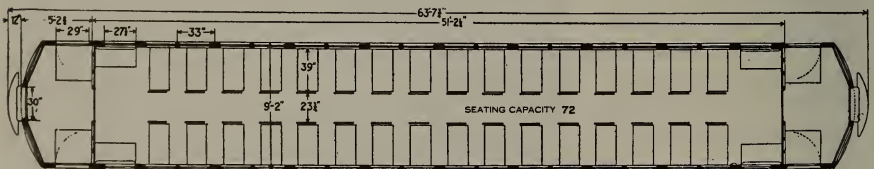
TWENTY-ONE CARS FOR OGDEN, LOGAN & IDAHO

BRILL 27-M.C.B. TRUCKS

FOR use on the new extension which has been built to its lines, the Ogden, Logan & Idaho Railway, popularly known as the Cache Valley Route, has purchased from the American Car Company fifteen 61-ft. 8-in. all-steel passenger, smoking and baggage cars and six passenger trail cars of the same type, except that they are a little longer and have but one compartment and consequently a large seating capacity—72—the motor car seating but 64. The fifteen motor cars are exact duplicates of an order of three cars built for this company a year ago

by the American Car Company, a description of which cars was given in an article published in BRILL MAGAZINE for March, 1915. The fifteen new cars were divided into two orders, the first being for twelve cars and the second for three more of the same type, which latter cars are at present in process of completion.

The equipment is to be operated on the company's new lines between Ogden, Utah, and Preston, Idaho, connecting with the Salt Lake & Ogden Railway at Ogden for Salt Lake City, a city of 110,000 and the hub of the terri-



TWENTY-ONE CARS FOR CACHE VALLEY. Height from track to underside of side sills, 42½ in.; height from underside of side sills over trolley boards, 9 ft. 8½ in.; height from floor to center of headlining, 8 ft. 5½ in.; track to step, 17¼ in.; step to platform, three steps, 11½ in. each; weight of carbody, 40,000 lb.; weight of trucks, 22,492 lb.; total weight, 62,492 lb.

tory served by the company. The distance from Ogden to Logan is 69 miles and from Logan to Preston is 28 miles, making a total of 97 miles. The system serves about eighteen towns, ranging from 500 to 2,500 in population. Four larger cities are located on the line—Ogden, a railroad and manufacturing center of 35,000 population; Logan, an agricultural center, 12,000; Preston, also an agricultural center, 7,500; and Brigham City, a fruit center, 4,500. The company operates regular freight business, interchanging freight with the Gould and Harriman lines and having through trans-continental tariffs in effect. Thus it is seen that this freight business forms a considerable part of the operation of the company, the towns along the line creating a good demand for freight and express as well as passenger service.

Passenger statistics for November, 1915, showed a total of 52,878 car miles and 77,177 passengers carried. For the handling of the passenger service, tickets are sold by station agents and although some cash fares are collected these tickets form the larger part of the system of fare collection. The

regular rate of fare is three cents per mile, the same as on the steam railroads, but the company offers a mileage book at two cents per mile. The average speed maintained on the line is forty miles per hour, with an average of one stop in two or three miles. The lines are laid on private right-of-way, the tracks, which are single, being laid on gravel ballast, thus making possible the maintenance of high-speed service. Current for the operation of the lines is purchased from the Utah Power & Light Company.

The changes of season affect the



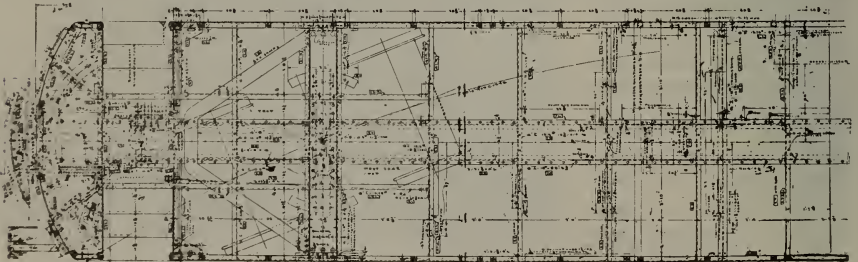
TWENTY-ONE CARS FOR CACHE VALLEY. These cars are for use on the company's new lines between Ogden, Utah, and Preston, Idaho



TWENTY-ONE CARS FOR CACHE VALLEY. The car whose interior is shown is especially, well adapted to trailer service on this line, its seating capacity of 72 persons guaranteeing ample facility for the handling of traffic

operation of this company very materially. In summer the demand for traffic facilities is increased very considerably by the baseball park, race tracks, Glenwood Park, a pleasure resort maintained by the company, and by other resorts in Ogden Canyon. In winter, although the officials of the company

do not have to guard against a uniformly deep snowfall, they experience trouble in the cuts because of the drifting of the snow, especially where the lines of the company cross the divide into the Cache Valley. The snow-fighting apparatus of the company consists of snow-plow attachments which



TWENTY-ONE CARS FOR CACHE VALLEY. The plate girder side construction is given extra reinforcements of upper and lower trusses



TWENTY-ONE CARS FOR CACHE VALLEY. These cars are equipped with train doors and multiple-unit control so that they may be used in train service with the trailers, which are also described

are designed so as to be applied readily to the motor cars, and several miles of snow fences which the company has built to protect its tracks.

The trail cars differ from the motor cars only in the seating arrangement, the underframe and body construction being identical. In each of the cars a special effort was made to keep the weight of the completely equipped car as low as possible still to be consistent with strength and rigidity and so allow for the heavy, high-speed interurban service of the lines. The carbody weight for the trail cars was but 40,000 lb., which is very low when the seating capacity of 72 persons is taken into consideration. The combined weight of the trucks is 22,500 lb., thus making the total weight of carbody and trucks 62,500 lb., or a weight of 868 pounds per seated passenger, which is noteworthy, especially when the heavy type of the service is considered.

The underframe upon which the cars are built is composed entirely

of steel beams, channels and angles. Side sills of 8-in. 13.75-lb. channel are used, and the two center sills are 8-in. 18-lb. I-beams with a 1/4-in. by 18-in. cover plate riveted to the top and extending the full length of the car. The cross sills are of steel channel and the diagonal braces extend from the drawbar anchor plates to the side sills at the bolsters, being riveted to all the longitudinal sills. The bolsters are of the built-up or trussed type, consisting of structural shapes and plates with channel fillers. Each side of the car is trussed.

The body frame of the car is of steel, the side posts of 2 1/2 by 1/4-in. tees. The corner posts and each alternate post separating the twin windows are double. The letter panels are of sheet steel extended continuously around the sides and ends of the car and riveted to the posts. The side sheathing is also of sheet steel riveted to the sills, posts and rails. The roof of the car is of the plain arch type, supported on steel carlines.

LIGHT-WEIGHT CARS FOR AUSTIN, TEXAS

BRILL 21-E TRUCKS

FOR operation in the capital city of Texas—situated on the Colorado River with an area of about 30 square miles and a population of about 45,000—the Austin Street Railway Company has purchased from the American Car Company, of St. Louis, three 18-ft. 3½-in. closed cars mounted on Brill 21-E Trucks. These cars are somewhat similar to an order built in 1914 by the American Car Company and described in an article appearing in BRILL MAGAZINE for June, 1914. The chief difference is in the length; the new cars are two windows shorter than those of the previous order and consequently they are considerably lighter in weight, a feature which will make for economy.

Besides being an important livestock center, Austin is the radial point of an agricultural territory sweeping for about 100 miles in every direction. The principal products of this territory are cotton, grain, alfalfa, sugar cane, fruits and vegetables and the city, being the distributing point for this territory, thrives accordingly. The University of Texas is located at Austin and the capitol building is said to be the largest of any state in the Union.

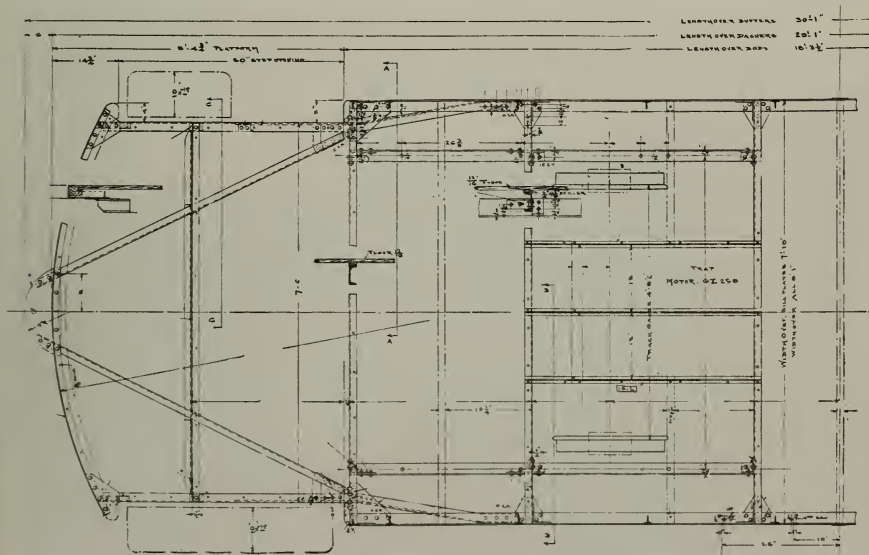
These new cars are for operation on the Rio Grande Line and are to run to the Blind Institution, a distance of about five miles. For this trip thirty minutes is required, the stops averaging thirty to the trip. There are no loops on this line and



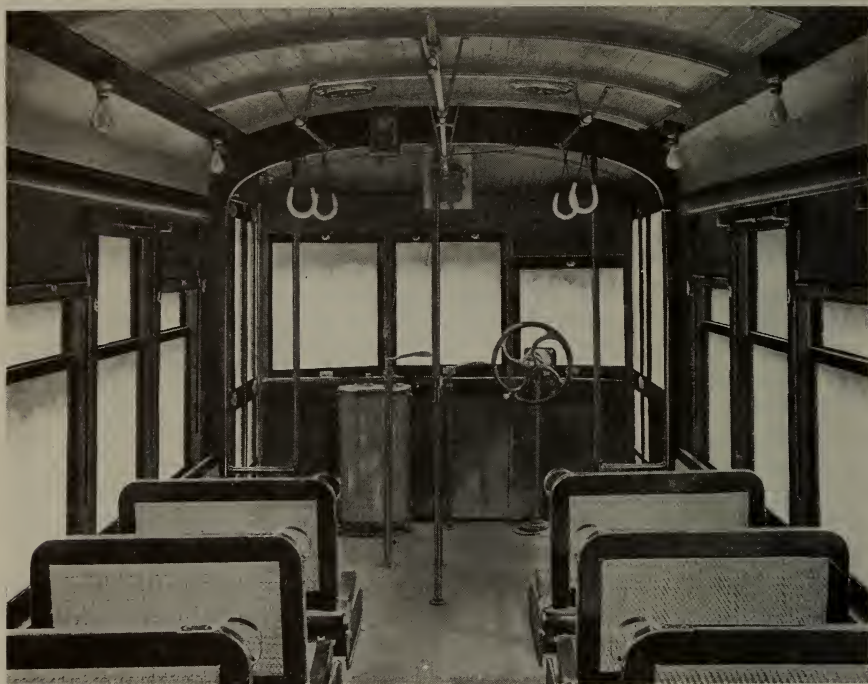
LIGHT-WEIGHT CARS FOR AUSTIN, TEXAS. These cars are somewhat similar to the type of an order previously built for the company; however, the new cars are shorter and therefore lighter in weight, the carbody weight coming under the weight of the former order by about 3000 lb.

the cars are run straight through the heart of the city. Although the Rio Grande and Blind Institution lines are considered as entirely separate and distinct from each other, radiating in either direction from the heart of the city, for the convenience of the passengers the schedules are so arranged that the cars are run straight through from

The new equipment takes the place of old cars which will be held in reserve for rush traffic. The cars are operated under the prepayment method of fare collection, the rate of fare being five cents with universal transfers. The company is permitted by law to charge a fare of ten cents per passenger



119



LIGHT-WEIGHT CARS FOR AUSTIN, TEXAS. The interiors of the cars are finished in cherry

between the hours of 10 P. M. and 6 A. M., but for the last ten years this has not been done.

The traffic statistics for the year 1914 show a total of 6,203,380 passengers carried with a total of 1,237,437 carmiles. For 1915 the figures showed a total of 5,874,221 passengers carried with a total of 1,299,378 carmiles, a good ratio of passengers carried to carmiles.

The cars are mounted on underframes in which side sills of $2\frac{1}{2}$ by $2\frac{1}{2}$ by $\frac{5}{16}$ -in. angle irons are used. The cross sills are of 4-in. 5.25-lb. channel iron, fastened to the side sill angles and truck sills with gusset plates. The dasher angles are of $1\frac{1}{2}$ by $1\frac{1}{2}$ by $\frac{1}{8}$ -in. steel fastened to the side sill angles

with gusset plates. The diagonal platform sills are of 3-in. 4-lb. channel iron extending 6 in. beyond the dasher and having a $\frac{3}{16}$ -in. plate riveted top and bottom to form the drawbar pocket. The platform knees are of 6-in. 8-lb. channel iron fastened to the side sill angles, cross sills and dasher angles and set in 5 in. from the side of the car.

In the body framing of the car corner posts of $1\frac{1}{4}$ by $1\frac{1}{4}$ by $\frac{1}{8}$ -in. angle iron are fastened to the wood corner posts and the side posts are of $1\frac{1}{2}$ by $1\frac{1}{2}$ by $\frac{3}{16}$ -in. tees, both corner and side posts extending continuously from side sill to side sill. The top sash is made in one continuous piece.

THE ELECTRIC RAILWAY SYSTEM OF MADRID

MADRID, capital of Spain and of the Province of Madrid and situated on the left bank of the River Manzanares, a tributary of the Jarama, in what is practically the center of the peninsula, nearly equidistant from the Bay of Biscay, the Mediterranean and the Atlantic, has one of the most interesting transit systems of any of the large foreign cities. The city proper, exclusive of its modern suburbs, is shaped almost like a square, except that the corners are rounded off. Formerly the city was surrounded by a poor wall, partly of brick and partly of earth, about twenty feet in height and pierced by five principal gates and eleven doorways. These gates

are of particular interest. At present only three of them actually exist, the Puerta de Alcalá, on the east, and the Portillo de San Vicente, on the west, being the oldest, dating back to the time of Charles III (1759-1788). The city has grown beyond the other two, the situation of one of them being in the present center of the city. At this site now is located the Puerta del Sol, the largest of the city's plazas and the densest traffic point, which is shown in an accompanying illustration. This plaza derived its name from the former east gate of the city, which stood until 1570 and had on its front a representation of the sun. From the plaza diverge ten of the prin-



ELECTRIC RAILWAY SYSTEM OF MADRID. Puerta del Sol. Formerly one of the gates of the city was located here; at present it is the heart of the city

cipal streets of the city, and consequently the tramway lines practically all pass here.

The city is built on an elevated and undulating plateau of sand and clay, which is bounded on the north by a chain of mountains and merges on all other sides into the barren and treeless tableland of

Madrid is 2,370 feet above the level of the sea, and owing to this high altitude and its open situation the city is subject to sudden and frequent variations of climate, and the daily range of temperature sometimes exceeds 50 degrees Fahrenheit. In winter the northerly gales from the Sierra Guadarrama



ELECTRIC RAILWAY SYSTEM OF MADRID. Calle Alcalá

New Castile. The surface of this plateau is furrowed by numerous watercourses, which are dry except at rare intervals. Even the Manzanares is quite insignificant as a stream during most of the year; it is spanned, however, by six bridges. For the most part the other streams coursing through the city are constantly dry and in many cases their beds have been converted into roads.

The climate of the city is peculiar. The highest point in

bring intense cold, snow falls frequently and skating forms one of the chief sports. A Spanish proverb describes the wind of Madrid as so deadly that "it will kill a man when it will not blow out a candle." In summer the heat is rendered doubly oppressive by the fiery, dust-laden winds which sweep across the Castilian tableland; at this season the thermometer hovers around 110 degrees in the shade. Much has been done to improve the sanitary conditions of the city in



ELECTRIC RAILWAY SYSTEM OF MADRID. Place Colon

the last thirty years. The streets are deluged three times a day with fire hose but even that has but little effect upon the dust.

Few capitals have developed more extensively their electric and horse tramways, gas and electric light installations and telephones than has Madrid. The population of the city in 1877 was 397,816 and in 1900 it was 539,835, the largest population for any Spanish city. It is the see of an archbishop, the focus of the principal Spanish railways, the headquarters of an army corps, the seat of a university, the meeting place of the parliament, and the chief residence place of the king, the court and the captain-general of New Castile. It is surpassed in commercial importance only by Barcelona. The principal articles of manufacture are leather goods, fans, umbrellas, sunshades, chemi-

cals, varnishes, porcelain and pottery.

The suburbs of modern Madrid have spread to the north and east of the city. The new parts of the city, with their broad streets and squares and their villas, sometimes surrounded by gardens, their boulevards lined with stunted trees and their modern public

buildings, all resemble the similar features of other European capitals and contrast with the old Madrid that has preserved so many of its traits in architecture, life and habits, and that dates back to the tenth century. Some of the streets have been slightly widened and in many thoroughfares new houses are being built among the ugly, irregular dwellings of the eighteenth and earlier centuries. This contrast is noticeable right in the heart of the city.

The city is constructed so that



ELECTRIC RAILWAY SYSTEM OF MADRID. Place Independencia

the tramways have to encounter medium grades, the maximum being 4.8 per cent. For the operation light cars such as are shown in the illustrations are used. The smaller car, mounted on a single truck, weighs but 19,510 lb., while the larger car, mounted on double trucks, weighs 28,219 lb. The principal dimensions of the standard car in use in the city are: Length over all, 27 ft. 6 in.; length over platforms, 26 ft. 2½ in.; length over end panels, 15 ft. 4 in.; width over sills, 6 ft. 10 in.

The fare system is based on zones in which the longer lines are divided. Tickets are given for every zone and separately for every direction. Hence, the conductor has to carry along twice as many blocks of tickets as there are zones

on his line. There are no transfers or monthly tickets.

Current is contracted with the "Hidro-Eléctrica Española," which owns extensive power plants in Molinar and Villora. The distance of high-tension transmission line (60,000 volts) to Madrid is about 150 miles. The current is transformed in the sub-stations of Madrid to 6,000 volts and converted by motor-generators to direct current at 550 volts. As a reserve there is a power station of two turbo-generators of 3,500 and 6,000 kw., 6,000 volts which serves in cases when the transmission line is interrupted. Moreover a second reserve consisting of some steam engines driving d. c. dynamos representing the original power station is kept always under steam and



ELECTRIC RAILWAY SYSTEM OF MADRID. Suburban car on Brill 21-E Truck



ELECTRIC RAILWAY SYSTEM OF MADRID. Suburban car with Brill Maximum Traction Trucks

ready to substitute the whole a. c. system.

Altogether there are about 52 miles of electric tramway lines in the city and about nine miles in the suburbs, the roadbed for the most part being double-tracked. The rails are laid partly on gravel and partly on concrete about 8 in. thick. Grooved rails of 105 lbs. per yard are used, the points and cross-

ings being mostly of manganese steel.

Overhead wire is conducted sideways on iron poles with brackets. The maximum distance between center of track and the overhead wire is eight feet. The trolleys have special harps in vertical bearings which allow turning to all sides while trolley wheel runs always in the center line of the wire.

In one of our largest cities "passenger directors" have been installed at principal down-town transfer stations to direct patrons of the railway company during the rush hours. This would seem to be a good means of cementing public favor, besides furnishing a nice little plum for which the platform men might contest, it being the thought that a slightly advanced rate of pay be allowed for such service.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

WHAT DISHONESTY MEANT TO 381 MOTORMEN AND CONDUCTORS

STATISTICS of one of the largest electric railway companies in the United States, employing about 9,000 trainmen, show that during the last year 381 men were discharged. This percentage has been commented upon as being small, and in the very same paragraph with that comment is contained the information that 95 per cent. of the discharges were because of intoxication or dishonesty! If this percentage—41¼—is small enough to be commented upon favorably, then surely there is something wrong with man in general. In other words, if the proportion of discharges on this road was comparatively small enough to be considered worthy of mention—and very likely that is true—then it would seem that man in general is in need of a good stiff jolt. The discharge of those men after a thorough investigation of their respective cases shows that there was no plausible excuse for their dishonesty; their mentality simply had become warped, and unless they get it straightened out in pretty short order it will consign them to the scrap heap before very long. As for the fellows who let whiskey take them off their platform jobs—their case is pitiful, because the habit can be broken with a little exertion of will power. If they couldn't break it when their jobs were at stake, what will it do with them when they have no jobs?

The man the next step above you is not always the most efficient man on the line; sometimes he's the luckiest. Maybe his place will need filling some of these days.

If it were possible to get together a definite analysis of the failures of life, to pick to pieces the character of each man that has tried and failed or each man that has failed without trying it is safe to say that the following would be found to be the principal reasons for those failures: Debt, speculation, dissipation, inferior or vicious associates, over- or under-confidence in humanity, moral or intellectual ignorance, and last of all and most important of all—loss of energy and ambition.

INERTIA

ONE of Newton's three laws of motion, laws upon which the business which gives you your bread and butter is founded, is that a body remains at rest or in continuous motion until opposed by some force tending to produce motion in it or to bring it to rest, as the case may be. This law would apparently indicate perpetual motion as being entirely within the bounds of reason. But gravity takes care of that. Were it not for gravity there might be such a thing as perpetual motion and, on the other hand, were it not for the external forces—many of them man-created—there would be nothing but inertia. The thought is that you yourself will lie still in one spot from now to doomsday unless some force is exerted upon you to set you in motion. Will you wait for that force to be exerted upon you by an all-kind Providence or will you look about for one of the many man-created forces and overcome inertia yourself? It takes an initial boost up the pathway of life for a man to become successful, and the best person to give you that boost is yourself.

Greatness lives only in the happy anticipation of being finally understood and of fulfilling a high destiny, caring not for the opinions of others, fearing not the ridicule of others, shrieking not for instant and loud acclamation, but running along smoothly in its own path, minding its own business and laboring ever with a definite goal in view.

THE SWEARER A LAZY MAN

JUST as there is swearing and swearing, so there are swearers and swearers. And, strange to say, the general opinion of swearers and swearing has become strangely warped. The tendency seems to be to consider the man who uses a string of profanity calculated to scorch the ears of all within radius of his voice as a rough-and-ready sort of customer. Generally he is quite the opposite and merely resorts to excessive use of profanity to cover up some deficiency of character. The really bad men have not been swearers and neither have the really good men; it is merely the in-between fellow, who is too weak or too lazy to stiffen his morality, who resorts to this subterfuge. There is not a question of doubt that some men use profanity because they are lazy—they reason that ministers of the gospel and other clean-minded men who do not swear are looked to for a great deal more—a great deal more is expected of them—than is the case with men who make a practice of swearing occasionally—or more than occasionally. And so they swear.

Always bear in mind the fact that there is a world of difference between being full of hot air and getting up steam.

THE PLATFORM MAN A PERSON INSTEAD OF A NUMBER

ONE of the most interesting steps that has been taken in welfare work by electric railway companies is that of the Cumberland & Westernport Electric Railway, of Cumberland, Md., which has decided to place in each car on its lines a card bearing the names of the motorman and conductor of that car, so that passengers, should they find it necessary to complain or speak well of the service given by the crews, may be able to mention the names of the men instead of referring to a number as heretofore. It would seem that the benefit of such a scheme is more far-reaching even than that. It will create an interest on the part of the constant riders in the men whose cars they patronize because, knowing the names of the men, the patron will feel a more or less personal interest in the man and therefore in the company for which he stands. But even greater than this benefit is the good which will be done among the platform men themselves. The plan will have the tendency to make the men feel as though they are direct representatives of the company, designated by name instead of by number. It surely will serve as a great boost to the men who are imbued with ambition. Although perhaps not practicable on some lines, the plan seems well worth consideration.

When you hear a man end his argument with a string of oaths it is a safe bet that he knows nothing more to say and that is his own little way of proclaiming his defeat.

The constitutional right which is given a man whereby he may do exactly as he pleases is limited only by his duty to other people who live in the same world with him. He may not encroach upon the rights and property of others in doing what he pleases.

Fret is a grindstone; man holds his nose on it and then, like a silly donkey, turns the handle.

If you are traveling on the road to success you have but very little time to stop and pluck bouquets by the roadside.

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THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



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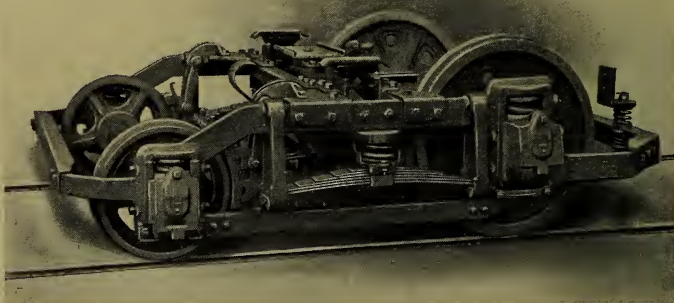
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THE BRILL 39-E TRUCK

THE purchaser of transportation—the car-riding public—judges the service it buys almost entirely by the comfort with which it rides. The car-rider does not have the time or inclination to think about the causes for rough, uneven riding. That part he puts up to the railway manager. It is the finished result in which interest is shown. And that was how the Brill Graduated Spring System came to have its birth; it was the result of a demand for smooth-riding cars. The combination of light-load springs with springs designed for the maximum load automatically adjusts the spring system to the light or heavy load and produces easy riding at all times. The 39-E Truck, equipped with this bump-, jar-, rattle-removing system and with its advantage in lightness, is proving more than popular. In addition, its wide truck centers permit a lightness in body construction which is an undeniable advantage.

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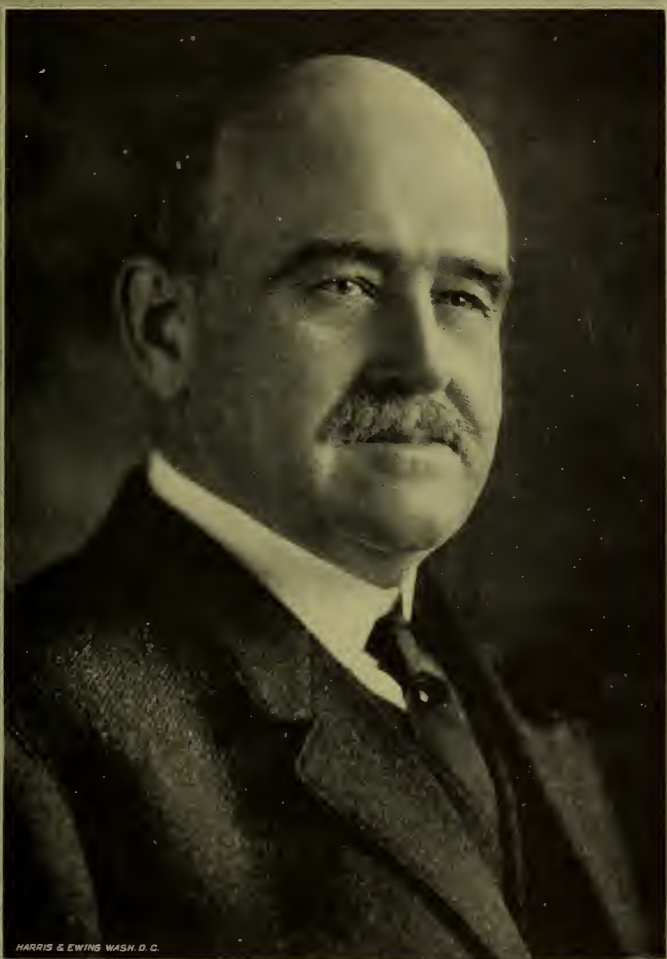


Penn Square
Lancaster, Pa.



THE BRILL RADIAL DRAWBAR

THE single spring with which Brill Radial Drawbars are equipped is arranged on the bar so that it performs the functions of both draw and recoil; thus the bar may be said to be self-contained and there are no loose parts to repair or replace. The coupling end of the bar (made of malleable iron, the bar proper being of wrought iron) is covered by the spring as by a sleeve; both it and the drawbar itself are grooved and pinned so as to allow for the sliding caused by the tension and compression of the spring—the spring is stopped at each of its extremities by a collar, one on the drawbar itself and the other on the sliding end. This bar is designed for cars of less than thirty feet over the body; for larger cars the channel-iron drawbar is sold. Both bars are made in standard sizes or they may be ordered specially. The standard for the bar is four feet from center of draw-bolt hole to center of drop-pin hole; in the channel-iron bar this dimension is four feet three inches.



HARRIS & EWING WASH. D. C.

W. M. Mulvey

PRESIDENT, ILLINOIS TRACTION SYSTEM

*I approve of a reasonable state or federal control
of railroads and public utilities.*

*I am heartily in favor of cordial working rela-
tions between the management and employes.*

*I believe in proper employer's liability laws, in
hospital associations and death benefit associa-
tions maintained jointly by the employer and
employes.*

WILLIAM B. MCKINLEY.

MAY 15, 1916

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WILLIAM BROWN MCKINLEY

WILLIAM BROWN MCKINLEY was born in Petersburg, Illinois, in September, 1856. He attended the University of Illinois at Champaign. When he left college his first venture in the business world was a drug store, but later he became engaged in the business of farm loans with his uncle, in Champaign. He early saw the advantages of electric railways to the country districts and his start of the present Illinois Traction System was made at Danville, where he built a short line from that city to Westville, in 1890. This line formed the nucleus and additions to the line, running to Champaign and Decatur, quickly followed. The system rapidly grew until it reached its present proportions. It owns or controls more than forty railway, light and power companies throughout the states of Illinois, Kansas, Missouri, Iowa, Nebraska, Wisconsin and has lines extending into Canada. Many of these subsidiary companies in their turn own or control other railway, light or power companies. Altogether about 800 miles of track, including street car lines, come under the supervision of the company. Its freight system is very extensive and forms a large and important part of the business done by the company. Mr. McKinley represents the Nineteenth Illinois Congressional District in the House of Representatives, at Washington.

INTERURBAN CENTERS AND INTERURBAN CARS

LANCASTER



OCCUPYING what is nearly the geographical center of Lancaster County, which is bordered on the west and south by the picturesque Susquehanna, Lancaster, one of

Pennsylvania's most progressive cities, is placed so that it affords excellent transportation facilities for manufacturers and merchants, and its growth has been chiefly attributable to that fact. The city is but one hundred miles from the Pennsylvania coal fields, 69 miles from Philadelphia and three and one-half hours from New York, being situated on the main line of the Pennsylvania Railroad and on the Philadelphia & Reading System.

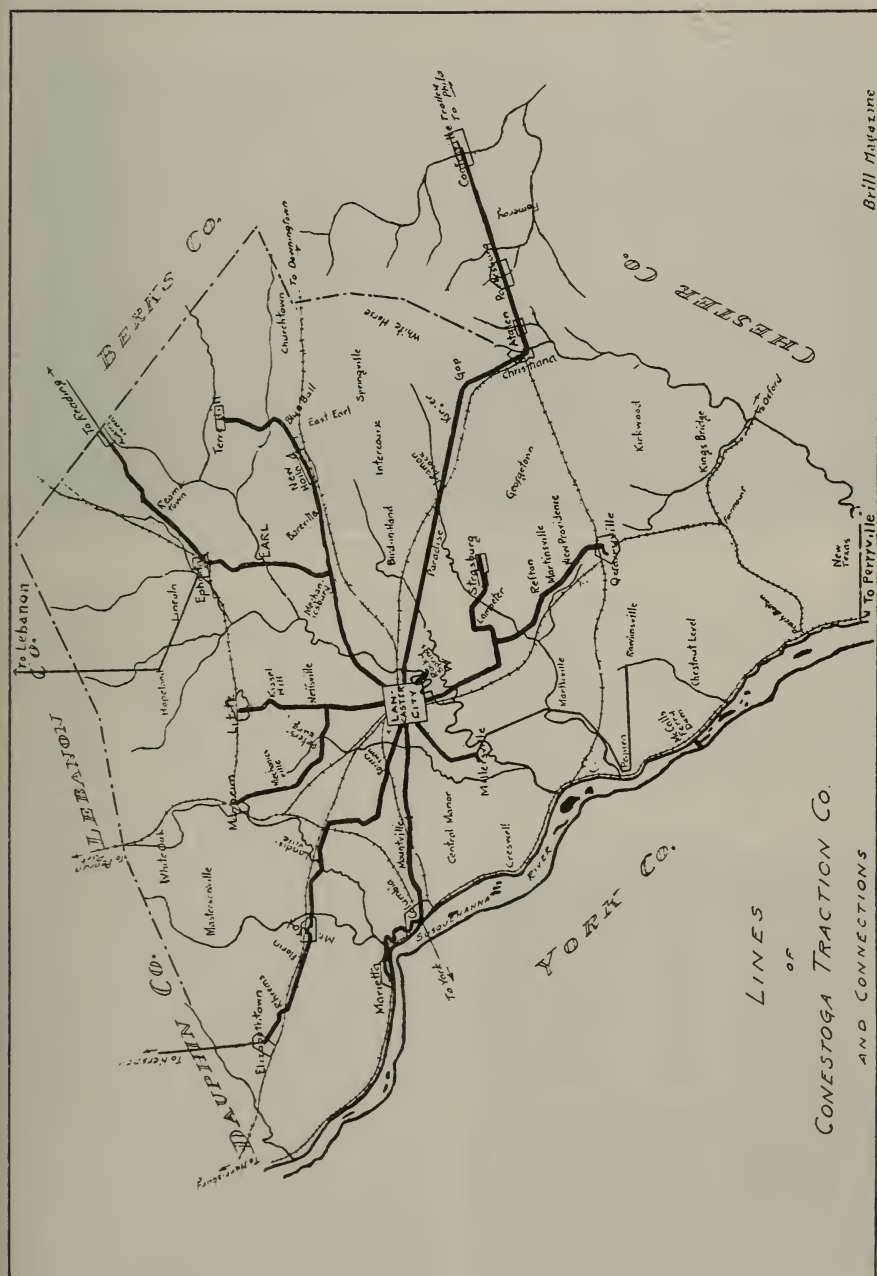
The city really had its birth in an Indian village called Conestoga. Out of that village—the site for which, placed in the fertile valley of the Conestoga, was wisely selected by the cunning Indians—grew a town known as Hickory Town, mushrooming up about a tavern called the “Hickory Tree.” This stage of the city's history dates back to 1721. From the town the city sprang and the name of Lancaster was given it. In 1910 the city covered four square miles and the census returns showed a total population

of 47,227, which does not include the suburbs in immediate contact with the city's boundaries, the population of which totals about 12,000.

This suburban population, recognized as of high importance to the city because of the large proportion employed in the city, is served by an extensive interurban system operated by the Conestoga Traction Company. This company also operates a most excellent city system, and its dozen interurban and suburban lines radiate into every section of the county and serve also adjoining counties, it being estimated that more than 400,000 people are given the advantage of hour and half-hour service every day in the year.

Anthracite and bituminous coal from the Lehigh Valley, in the northeastern part of the State, and other coal fields in West Virginia, are near enough to Lancaster to make the cost of fuel comparatively cheap, and as a consequence the city has attracted many manufacturing establishments, each of which of course adds to the financial standing of the city.

In the four square miles within the city's limits there are seventy-six and one-half miles of streets with an average width of seventy feet, showing the progressiveness of the city. These streets are constructed with comparatively mod-



Brill Magazine

LINES
OF
CONESTOGA TRACTION CO.
AND CONNECTIONS



INTERURBAN CENTERS AND CARS. View from Chickies Turnout—Columbia and Marietta Line

erate grades. Altogether the city has about 240 acres of ground given over to parks, the municipality owning 170 acres and the rest being privately owned.

The richness of the agricultural district surrounding Lancaster is

responsible for the city having attained the reputation of cheap living facilities. The surrounding territory provides fresh vegetables and dairy foods through six market houses and many farmers make a livelihood by house-to-house distribution of their farm and truck products, selling at low prices. The city owns one central market house and the other five, all well-built of brick, are owned by incorporated companies.

One of the largest single industries of Lancaster is the Union Stock Yards, covering about 20 acres, on which are erected three hundred cattle pens. This business amounts to about \$10,000,000 annually. The annual value of the tobacco crop of the country surrounding Lancaster approximates \$4,000,000. The farm property and products of this territory are worth more than \$99,000,000, and



INTERURBAN CENTERS AND CARS. Conestoga Building



INTERURBAN CENTERS AND CARS. View from Chickies Turnout—Columbia and Marietta Line

the value of the annual crops and live stock is \$21,500,000.

The Conestoga Traction Company is controlled, through ownership of common stock, by the Lancaster County Railway & Light Company. This company—itsself controlled by the United Gas and Electric Corporation of New York City—also controls the Edison Electric Company and the Lancaster Gas Light & Fuel Company, which latter company owns a majority of the common stock of the Columbia Gas Company. The Traction Company purchases the energy used in the operation of its lines from the Pennsylvania Water & Power Company, as does also the Edison Electric Company.

About fifteen miles from the city is located the Holtwood hydro-electric development, on the Susquehanna River, with a present capacity of 70,000 kw. and provision

for 30,000 kw. additional. This development is connected with the Lancaster central station by a transmission line and receiving station. The company has three sources of power: Engleside Steam Generating Station, located in the city of Lancaster, with a capacity of 7,000 kw.; Holtwood Water Power Station and the Slackwater Water Power Station. In addition, transmission of power from Baltimore is possible.

The traction company operates into and out of Lancaster through seven main arteries. Three of these lines fork a short distance out of the city, making practically ten divisions, each serving a different district. These lines radiate in all directions from the city, and thus the system covers quite an extensive territory. The definite total of the populations of towns tributary to the lines of the company is

163,000, and of course the rural districts, which cannot definitely be estimated, bring the total population deriving the benefit of the company's service up to about double that figure.

One of the most important divisions of the company—if not the most important—is the line running east from Lancaster through Paradise, Leaman Place, Gap, Christiana and Parkesburg to Coatesville, where connection is made with trolley for West Chester and Philadelphia. The importance of this division, serving as a direct link between Lancaster and Philadelphia, passing through a very populous district, is easily seen.

Direct communication between Lancaster and Reading is effected by another division of the system which runs northeast through Mechanicsburg, Ephrata and Reamstown to Adamstown, where connection is made for Reading. At Mechanicsburg, on this division, another line branches off and runs to Terre Hill, passing through Bareville and New Holland.

Due west of Lancaster, on the Susquehanna River, lies Columbia, whose population is about 12,000. The division serving Columbia passes enroute through Mountville and, leaving Columbia, follows the Susquehanna to Marietta. Almost paralleling this Columbia



INTERURBAN CENTERS AND CARS. Power plant and distribution station (reserve)



INTERURBAN CENTERS AND CARS. Typical view of line, looking toward Lancaster—
Columbia Line

Division as it leaves Lancaster, but located to the north of it, is another line which runs through Rohrerstown, Landisville, Florin, Rheems and Elizabethtown. At the latter place connection is made for Hershey.

To the south of Lancaster there

are two divisions, one of them—a comparatively short one—serving Millersville, where is located a State normal school, and the other running almost due south to Quarryville, passing through Ref-ton, Martinsville and New Providence. From this latter division



INTERURBAN CENTERS AND CARS. Typical freight car in service on the line



INTERURBAN CENTERS AND CARS. Christiana and Coatesville car

there runs a branch road serving Strasburg.

The other two divisions are due north of Lancaster, one running to Lititz and the other branching off near Neffsville and passing through Petersburg, Mechanicsville and terminating at Manheim. Altogether the company operates about 164 miles of roadbed, of which total 161 miles are single track.

The company transmits its cur-

rent from the water-power company at 66,000 volts and sends it out over its own lines at 11,500 volts, it being stepped down at the various sub-stations—located at Groffdale, Reamstown, Neffsville, Vintage, Parkesburg, Columbia, Salunga, Rheems, Martinsville and Lampeter—to 575 and 600 volts.

The standard car in operation on the lines of the company measures 40 ft. 1 in. over the vestibules, 41 ft. 5 in. over the bumpers, 8 ft. 6 in. over the side sheathing and has a seating capacity of 44 persons. The weight of car and trucks fully equipped is 32,000 lb. The cars, built on wooden underframes, are designed for double-end operation and are mounted on Brill 27-F and 27-G Trucks, the suburban cars having four motors and the city cars



INTERURBAN CENTERS AND CARS. Typical station of the company, located at Mechanicsburg, junction of the Ephrata and New Holland Divisions of the Lancaster, Mechanicsburg & New Holland Line

but two, the average being about 40 horsepower. Under normal conditions the company has in operation seventy-four of these cars, but, including the open cars, there is a total of 112 available for use.

The traffic statistics of the company for the last year showed a total of 4,571,290 cash fares and 6,755,627 tickets, making a total revenue of 11,326,917 fares. Transfers totaled 1,200,219 and passes totaled

312,701, making a grand total of 12,839,747 fares. These totals are not calculated on the five-cent basis.



INTERURBAN CENTERS AND CARS. Conestoga Traction waiting-room and transportation offices



INTERURBAN CENTERS AND CARS. Interior of standard car in use on the lines of the company

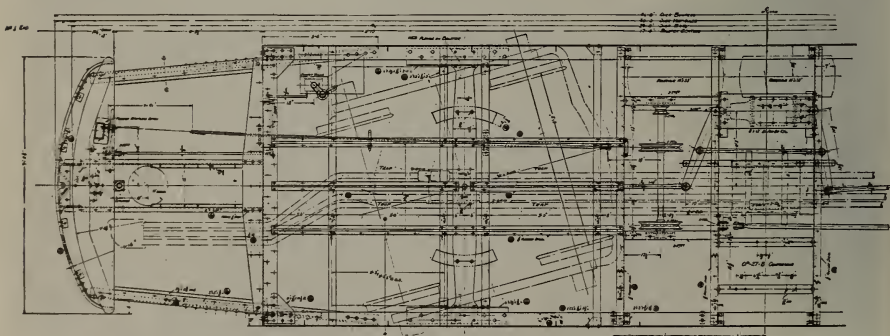


LOW-LEVEL CARS FOR WILMINGTON & PHILADELPHIA TRACTION COMPANY

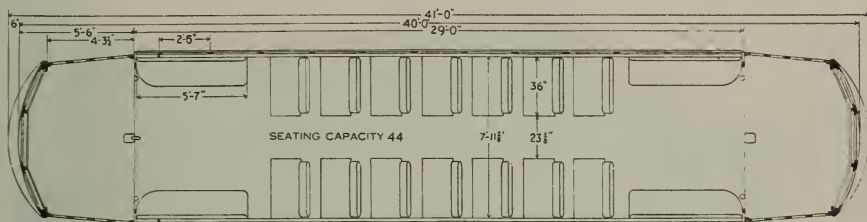
SEMI-CONVERTIBLE WINDOW SYSTEM

DESPITE the fact that they have been in operation but a comparatively short time, thirty-one 29-ft. Semi-convertible low-level cars recently built for the Wilmington & Philadelphia Traction Company by The J. G. Brill Company already are being reported upon by the officials of the road as being more than satis-

factory in every detail. The cars were thrown into operation immediately upon their receipt, and a more enthusiastic appreciation by the public of their all-round perfection of design could not be asked. Half of the order has been consigned to Wilmington and the others have been put into operation in Chester. The officials of



LOW-LEVEL CARS FOR WILMINGTON & PHILADELPHIA TRACTION. The cars have been divided between Chester and Wilmington and their operation is proving equally satisfactory in either place.



LOW-LEVEL CARS FOR WILMINGTON & PHILADELPHIA TRACTION. Height from track to underside of side sills, 26½ in.; height from underside of side sills over trolley boards, 9 ft. 1¼ in.; height from floor to center of headlining, 7 ft. 9 in.; track to platform, 15 in.; platform to floor, 13½ in.; weight of carbody less electrical equipment, 15,000 lb.; weight of electrical equipment, 1,200 lb.; weight of airbrake equipment, 1,000 lb.; weight of trucks, 9,400 lb.; weight of motors, 3,440 lb.; total weight, 30,040 lb.

the company report great economy in operation effected by the cars. Rapid acceleration and economy of power in the easy drifting have more than exceeded what was ex-

pected of the cars. In addition, the people served by the system, in Wilmington and Chester and adjacent towns, are very pleased with the cars and the increase in



LOW-LEVEL CARS FOR WILMINGTON & PHILADELPHIA TRACTION. The cars are proving very economical in operation, their coasting qualities being commented upon by the officials of the company as exceptional.



LOW-LEVEL CARS FOR WILMINGTON & PHILADELPHIA TRACTION. Above is shown the densest traffic point in Chester, showing the Y. M. C. A. Building in the background. The city and suburban cars pass this triangle, as do also the interurban cars running to Wilmington. Below is the corner of Delaware Avenue and Market Street, Wilmington, showing the du Pont and Ford Buildings

patronage already is noticeable.

The Wilmington & Philadelphia Traction Company, which is controlled by the American Railways Company, together with the Southern Pennsylvania Traction Company, has a total of 136 miles of single track. The main line of the company operates from Darby south through Chester to Wilmington and to Delaware City, paralleling the Delaware River the majority of the distance and forming, for this reason, not only a means of direct communication but also a fine scenic trip, the tracks of the company being so close to the river as to provide an excellent view out across the river and into New Jersey. The line from Darby straight through to Delaware City makes a run of about forty miles, Delaware City being about fifteen miles south of Wilmington. Including the new equipment of 31 cars, there are now 301 cars in operation.

This total of 301 cars includes also the cars used to maintain the company's schedules on the division between Chester and Media and on the line between Media and Angora, on the outskirts of Philadelphia. This latter line runs from Media through Primos, Secane, Clifton and Lansdowne, following the Baltimore Pike and practically paralleling the Media Division of the Philadelphia, Baltimore & Washington Railroad,



LOW-LEVEL CARS FOR WILMINGTON & PHILADELPHIA TRACTION. Viscose Silk Company's mills, between Chester and Wilmington. A great throng of people is employed at this mill, and this of course aids the traction company

touching the edges of the towns along that line, including Swarthmore. The line has its terminus at the end of the Baltimore Avenue Line of the Philadelphia Rapid Transit Co.

Wilmington boasts a very rapid growth. In 1910 the census credited the city with 87,411, whereas the present population is estimated at about 120,000. The same rapid increase in population has taken place in Chester and its adjacent towns, such as Eddystone and Marcus Hook. Due to the large manufacturing establishments located at each of these places, thousands of mechanics, with their families, have located there within the last year.

It is claimed for Wilmington and Chester that they severally have made more rapid strides and have shown a greater prosperity than any section on the eastern seaboard; this also applies to the surrounding territory served by the trolley system. The location of several powder companies in Wilmington (which city often is called the home of the powder industry), as well as other large manufacturing plants, including fibre, ma-



LOW-LEVEL CARS FOR WILMINGTON & PHILADELPHIA TRACTION. Bird's-eye view, showing the power-houses of the Wilmington & Philadelphia Traction Company

chinery, leather tanneries, three large shipbuilding plants, cloth finishing and rubber hose factories, have done more toward the prosperity of the city, and consequently of the transit company, than anything else.

The company is operated from Wilmington, the executive offices being located there, but the Chester Division offices are in that city. The electric light and power business done by the company is considerable, the company supplying the entire electric light and power business of the cities of Wilmington, New Castle, Delaware City and Newark, Delaware, and vicinity, the southwesterly part of Delaware County, Pa., including the boroughs of Kennett Square, Avondale and West Grove, Pa., and also the towns of Elkton and Chesapeake City, Md., and vi-

cinity. The company also owns and operates a telephone system.

The company owns two parks on the outskirts of Wilmington—Brandywine Springs Park, about six miles from the city, and Shellpot Park, on the line to Chester. These parks are leased to amusement companies, the traction company being content with their rental and the increased patronage. It is expected that about \$100,000 will be spent during the coming season on park improvements.

In the Wilmington territory, besides the Wilmington & Philadelphia Traction Co., there formerly were three other systems—the Peoples Railway Co., the Wilmington Southern Traction Co., and the Wilmington, New Castle & Delaware City Railway Co., but recently all of these systems were



LOW-LEVEL CARS FOR WILMINGTON & PHILADELPHIA TRACTION. Bird's-eye view, showing the Delaware and Christiana Rivers and part of the manufacturing district of Wilmington

acquired by the Wilmington & Philadelphia Traction Co.

The seating capacity of the cars (forty-four) is an increase of eight over that of the type of car previously purchased by the traction company, and is about fifty per cent. greater than that of the regular single-truck equipment now in service. The use of 26-in. wheels is somewhat of an innovation in the section of the country which will be served by the cars, and it has met with universal approval, not only with the officials of the road, but with the public. The small wheel diameter permits of the omission of one step, the passengers stepping direct from the street to the platform and vice versa, another step leading from the platform into the car itself. Thus the car is entered by but two steps instead of by three as is

usually the case. The elimination of this step not only has made a decided impression upon the riding public—judging from the increased favor—but it also has found strong approval with the officials of the company. The center of gravity of the cars being low, the riding is smooth and easy and the coasting has been found to be remarkably good.

The cars, which are of the prepayment type, are built with no bulkhead between the platforms and the interiors of the cars. The prepayment method of fare collection is new on the system and its installation is being watched with a great deal of interest. The public of the cities in which the cars are in operation is falling rapidly into the proper method of entering by the rear and leaving by the front, and universal approval has been

shown of the system, preventing, as it does, any conflict between incoming and outgoing passengers.

The interiors of the cars are finished with mahogany trimmings, the ceilings being painted straw color. The seats are of the reversible type, covered with rattan. Outside, the finish of the cars follows the standard of the traction company — green, trimmed with cream. Striping and numbering and the monograms of the companies (S. P. T. and W. P. T.) are in gold.

The cars are constructed on steel underframes, the side sills of 5 by $3\frac{1}{2}$ by $\frac{5}{16}$ -in. angle with the long leg horizontal. At the bolster this side sill is reinforced with a 6 by $3\frac{1}{2}$ by $\frac{5}{16}$ -in. angle about 3 ft. long to relieve the strain on the horizontal leg of the sill angle. The end sills are of $\frac{3}{16}$ -in. pressed steel, the crossings being of $\frac{1}{8}$ -in. pressed steel riveted to the side sills. The bolsters are of cast steel, bolted to the side sills, openings being made in the bolsters for the passage of brake rods, conduits, etc. The outside platform knees are of 7 by $3\frac{1}{2}$ by $\frac{3}{8}$ -in. angle reinforced with 2 by 2 by $\frac{3}{8}$ -in. angle under the end sill.

These outside platform knees are suspended from the pressed steel end sill, the knee bearing directly under the side sill at the rear end. The center platform knees are of 4-in., 5.25-lb. channel, extending from end sill to bumper.

In the body framing of the car the side posts are of 2 by 2 by $\frac{1}{4}$ and $\frac{5}{16}$ -in. tees extending from the side sills to the top rails. The corner posts are of $\frac{3}{32}$ -in. steel and the side sheathing is of the same dimension, made in three sections. The Brill Plain Arch Roof runs the full length of the car, supported on U-shaped pressed steel rafters.

There are eleven windows on each side of the cars, the window-heads being straight. Each window has a double sash, both sashes arranged to slide into the roof, the lower sash hinged to the upper, according to the arrangement of the Brill Semi-Convertible window system. Each platform is inclosed with a stationary round-end vestibule, sheathed both outside and inside below the windows with sheet steel. Each of the vestibules is provided with three windows with single sash and all the windows are arranged to drop.

The standard platform knee used by the Brill Company is a 7 by $3\frac{1}{2}$ by $\frac{1}{2}$ -in. angle reinforced on the bottom at the end sill, or directly under the end sill, by a 2 by 2 by $\frac{3}{8}$ -in. angle extending a short distance forward and back. This knee has been found to be entirely satisfactory for all designs of cars, it being possible to hang upon it a platform 6 or $6\frac{1}{2}$ ft. long.

INTERURBAN CARS FOR PORTSMOUTH, OHIO

BRILL 27-M.C.B. TRUCKS

FOUR 45-ft., double-end, center-entrance, steel frame interurban cars have been delivered to the Portsmouth Street Railroad & Light Company by the G. C. Kuhlman Car Company, of Cleveland, Ohio. These cars are part of an order which included also two double-end interurban freight cars measuring 50 ft. over all, which cars will be shown in the next issue of BRILL MAGAZINE.

The equipment was purchased by the company for use on its new extension between Portsmouth and

Ironton, a distance of 26 miles, the line serving such towns as New Boston, Sciotoville, Wheelersburg, Franklin Furnace, Haverhill and Hanging Rock. The schedule time of the company for this route is one hour and twenty minutes between terminals, the stops averaging but one to the mile.

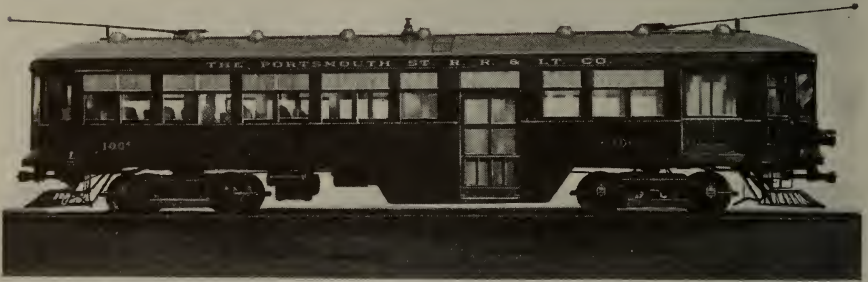
The district served by the company has for its principal industries the manufacture of iron, steel, brick, boots and shoes. This territory, including the populations of Portsmouth and Iron-



INTERURBAN CARS FOR PORTSMOUTH, OHIO. This compartment is divided from the smokers' compartment by a glass partition located at the center entrance

ton, gives the company a total tributary population of 57,000, the population of Portsmouth being 32,000 and that of Ironton 15,000. The most recent addition to the trackage of the company is the extension from Sciotoville to Ironton, upon which extension the new cars will be placed in operation. The construction of the company's lines physically is advantageous to economic operation, the heaviest grade being but 1.5 per cent. and

making a special effort, however, to impress the public with the importance of using the front exit, so as to obviate the conflict of incoming with outgoing passengers. Not only did this work to the comfort and convenience of the public, but it was found that it increased safety because it relieved the conductor of the necessity of watching the passengers entering and leaving. The company reported entire satisfaction with the equip-



INTERURBAN CARS FOR PORTSMOUTH, OHIO. These cars are built on steel underframes and have a steel frame construction with sides, roof and posts of steel. They are mounted on Brill 27-M.C.B. Trucks

the longest grade on the line 3,000 feet.

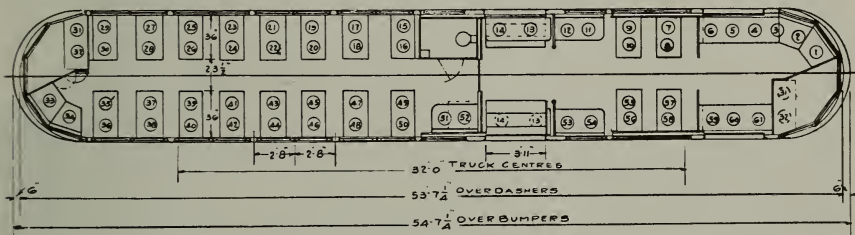
The cars will be routed straight to the center of each of the termini of the line. They will be operated under the prepayment plan of fare collection, which has been in effect for about three years. The first cars to be operated under the prepayment method of fare collection were built for the company by the Kuhlman Car Company in 1912. These cars were installed on the lines of the company which serve the business district, at first being reserved for the rush-hour traffic. The cars were built with exits at either end, the railroad company

ment and also reported that the cars early make a good impression on the public.

The cars are built on underframes which are entirely of steel, with the necessary exception of oak floor nailing strips, bolted to each crossing. Side sills of 6 by 3½ by 5/16-in. angle extend in one piece from corner post to corner post, bent down to support the steps at the door opening, which is about five feet off the center of the car. The bolsters are built up of two pressed steel channels measuring 8¼ in. over all in the center and provided with a 5/8 by 10-in. top cover plate and a

$\frac{3}{4}$ by 10-in. bottom cover plate, both the top and bottom cover plates being bent so as to come under the side sills and carry the car. On either side of the steps there is a trussed crossing made up of 3 by 3 by $\frac{1}{4}$ -in. angle, one at the top and one used as a double diagonal brace. The top chords of the center crossing are cut short so as to allow for the sliding of the door and on this crossing vertical angles are used to connect the top with the bottom

The platforms are integral with the underframe, the floor level remaining the same for each. The platform knees, made of angle iron 6 by $3\frac{1}{2}$ by $\frac{5}{16}$ in., start two feet toward the center from the bolster on each side of the car, extending under the side sill and diagonally to the crown piece angle, to which they are riveted, passing first through the trussed end sill. Between the end sill and the crown angle (which latter measures $3\frac{1}{2}$ by $3\frac{1}{2}$ by $\frac{5}{16}$ in.)



INTERURBAN CARS FOR PORTSMOUTH, OHIO. Height from track to underside of side sills, 3 ft. $3\frac{3}{8}$ in.; height from underside of side sills over trolley boards, 8 ft. $10\frac{1}{8}$ in.; height from floor to center of headlining, 7 ft. $11\frac{3}{8}$ in.; track to step, $14\frac{1}{8}$ in.; risers, $10\frac{1}{2}$ in.; seating capacity, 61; weight of carbody without electrical equipment, 26,700 lb.; weight of electrical equipment, 1000 lb.; weight of airbrake equipment, 2000 lb.; weight of trucks with gears, 18,800 lb.; total weight, 48,500 lb.

chord. Between these trussed crossings and the bolsters there are used 3-in., 5.5-lb. I-beams fastened to the side sills with corner angles. At each end of the side sill there is a trussed crossing made up of 2 by 2 by $\frac{1}{4}$ -in. angles, turned to act as an end sill and to support diagonal center knees.

The cars are provided with a double flooring, each $\frac{13}{16}$ in., the bottom of yellow pine and the top of maple. In the aisles and on the tops of the trap doors over the steps and the floor between the steps is used rubber tiling, $\frac{5}{16}$ in. thick, cemented to the maple flooring.

three angles are riveted to these knees, two for drawbar anchor support and the third for crown piece support.

The entire side of the car, together with the 6 by $3\frac{1}{2}$ by $\frac{5}{16}$ -in. side sill angle, forms a girder which carries the entire load to the bolster. The top plate is a $3\frac{1}{2}$ by 3 by $\frac{5}{16}$ -in. angle and the belt rail a $3\frac{1}{2}$ by $\frac{7}{8}$ by $\frac{3}{8}$ -in. angle. The side posts are $1\frac{1}{2}$ by $\frac{5}{16}$ by $\frac{1}{4}$ by 2-in. tees, one at each single post, the posts being built alternately single and double. The roof frame consists of an angle on each side— $2\frac{1}{2}$ by $2\frac{1}{2}$ by $\frac{3}{16}$ in., with the horizontal leg turned in.



INTERURBAN CARS FOR PORTSMOUTH, OHIO. The smokers' compartment is shown, the main passenger compartment being beyond and the baggage compartment, from which the photograph was taken, being in the near foreground.

Thirty-two steel carlines, $1\frac{1}{4}$ by $\frac{1}{4}$ in., are used, the feet of the carlines being riveted to the vertical leg of the side angle.

The car is divided into three compartments, one for baggage, one for smokers and the third a main passenger compartment for non-smokers. At the end of the car opposite from the baggage compartment there is located a door, the upper section of whose glass sash is arranged to drop. At each end of the car the vestibule sash is also arranged to drop. In the car proper the lower sashes on the side are arranged to raise to a height of 4 ft. $3\frac{1}{2}$ in. from the

floor to the underneath of the lower sash rail. The upper sash is made stationary, in one frame running the full length of the car. A diamond-mesh wire screen is fastened to the lower sash rail and is arranged to raise with the sash to any height, forming a guard for the glass at all times. This screen is designed so that it raises from and lowers into a pocket in the side lining and as it lowers or raises it closes this pocket opening so that no rubbish can be forced into the pocket.

The motorman's cab, at either end, is arranged with double swing doors, these doors to be left

open when the car is run in the other direction. A folding seat, arranged to raise, is located inside of the cab. In addition, the motor-man's cab is made so that it may be folded up when not in use, so that the folding seat may be used. The sliding doors at the center entrance are controlled by a pneumatic door-operating mechanism.

A toilet compartment is located in the main passenger compartment, opposite the heater location. A drinking tank with a holder for sanitary drinking cups is provided. The partition dividing the main passenger compartment from the smokers' compartment is located between the main compartment and the center entrance. This partition, with a long panel of glass, is arranged to slide into

a double pocket, glazed in the upper section. Thus no light is cut off. On the opposite side of the step opening a partition is placed, coming up 16 in. above the seat cushion and serving as an arm rest and also as a means for hinging drop seats, which drop seats are used over the trap doors when the latter are closed. A similar partition separates the baggage compartment from the smokers' compartment.

The seats are of the Brill "Winner" type, reversible and upholstered in black leather. The heater is removable and a longitudinal seat is provided, being designed to fit into the heater space. In the baggage compartment the seats are arranged to fold out of the way when not in use.

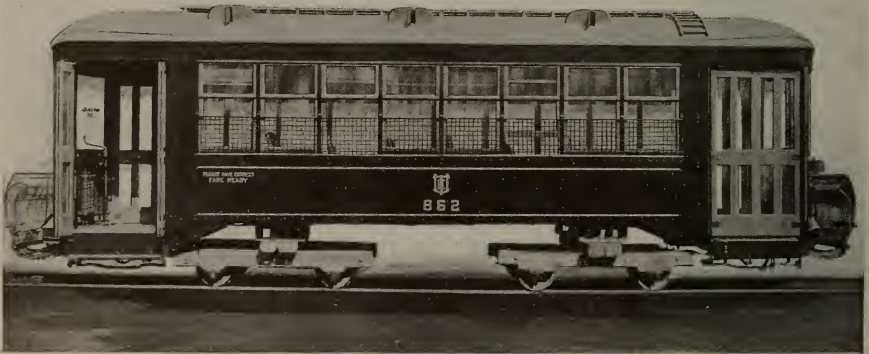
An important feature of carbuilding is the matter of clearance for the side bearings. Standard Brill practice calls for a clearance of $\frac{1}{4}$ in. between the side bearing and the rub plate on one side of the car when the bearing and plate on the other side are in contact. Thus the car rests on the center plates and either side plate, swinging from one side to the other as conditions demand. The necessity for this clearance is due to the banking of the rails on curves and the fact that the underframe of the car is built rigidly with no provision for twisting. Hence, as the leading truck hits the curve tremendous pressure is brought against the leading corner of the underframe, tilting the opposite rear corner until it swings through the clearance allowed and the plates contact. In steam practice this clearance is increased to $\frac{1}{2}$ in.

PREPAYMENT EQUIPMENT FOR UNITED TRACTION COMPANY OF ALBANY

SINGLE-TRUCK CARS

FOR operation on the lines of the United Traction Company of Albany, the Wason Manufacturing Company, of Springfield, Mass., recently has completed an order of fifteen

This position places Albany 145 miles north of New York and 165 miles west of Boston. Thus it may be seen that the city is close enough to the large centers of this section of the country to profit



PREPAYMENT EQUIPMENT FOR UNITED TRACTION OF ALBANY. The cars are built on all-steel underframes and mounted on single trucks

single-truck, double-end, prepayment carbodies. These cars will be installed upon the company's lines immediately upon their receipt. The urban railway system of Albany is of more than passing interest, the city itself being exceedingly interesting from a commercial, physical or historical standpoint.

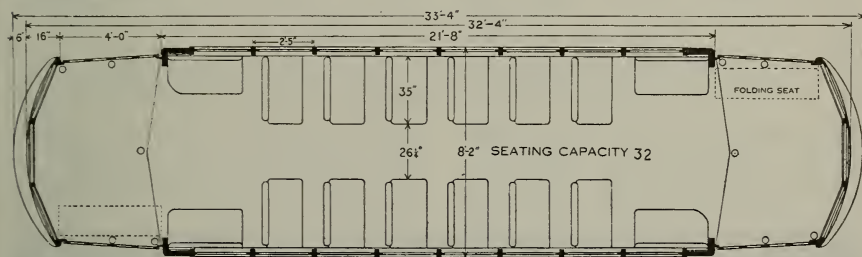
Beside being the capital of the state of New York, Albany is the county seat of Albany County. The city is situated on the west bank of the Hudson River just below the mouth of the Mohawk.

materially by its location. Albany is also a terminus of the New York Central & Hudson River, the Delaware & Hudson and the West Shore Railways; in addition, it is served by steamboat lines on the Hudson River and by several inter-urban electric railways which connect it with other cities.

In 1910 the census returns showed a total population of 100,253. This was an increase from a total of 94,151 in 1900. The progressiveness of the city may be seen also from the fact that it has more than ninety-five acres of

boulevards and avenues under park supervision and several fine parks (seventeen, with 307 acres in 1907). Also the city owns its own water supply, filtration plant covering twenty acres with a capacity of 30,000,000 gallons daily, and storage reservoirs with a capacity of 227,000,000 gallons. The older portions of the city are reminiscent of Dutch Colonial days, and some fine specimens of Dutch and later architecture still are standing.

thirteen original colonies. It has been claimed, and it seems likely, that the French traders ascended the river as far as the site of the present city in the first half of the fifteenth century, and it is claimed by some writers that a trading post was established in 1540. The authentic history of the city, however, may be traced from 1614, when Dutch traders built on Castle Island, opposite the city, a post which they named Fort Nassau. In 1629 Killiaen van Rensselaer, a



PREPAYMENT EQUIPMENT FOR UNITED TRACTION OF ALBANY. Height from track to underside of side sills, 2 ft. 5 $\frac{3}{4}$ in.; height from underside of side sills over trolley boards, 8 ft. 10 $\frac{1}{4}$ in.; height from floor to center of headlining, 7 ft. 10 $\frac{1}{8}$ in.; track to step, 13 $\frac{1}{2}$ in.; step to platform, 11 in.; platform to floor, 9 in. with 2-in. ramp; weight of carbody without electrical equipment, 12,400 lb.

Albany not only is an important railway center but it is also an important commercial center, particularly as a distributing point for New England markets, as a lumber market and—though perhaps to a less extent than formerly—as a depot for transshipment to the south and west. Among the manufactories are breweries, iron and brass foundries, stove factories, knitting mills, cotton mills, clothing factories, etc.

The historic interest attached to the city of Albany centers principally around the fact that the city was probably the second place to be settled within the borders of the

diamond merchant of Amsterdam, was granted a tract of land comprising about twenty-four square miles, centering at Fort Orange, which is practically the site of the present city. The place went through the various turns of fortune and misfortune of the early Colonial days, and in 1797 it became the permanent capital of New York state. In 1839, following the death of Stephen van Rensselaer, Albany was torn by what was known as the "Anti-rent War." This trouble was brought about by the efforts of the heirs of the van Rensselaer estate to collect money which they claimed was due

from their tenants for back rentals. The uprising reached such proportions as to necessitate the calling out of the state militia and considerable damage was done before the disturbance was quelled.

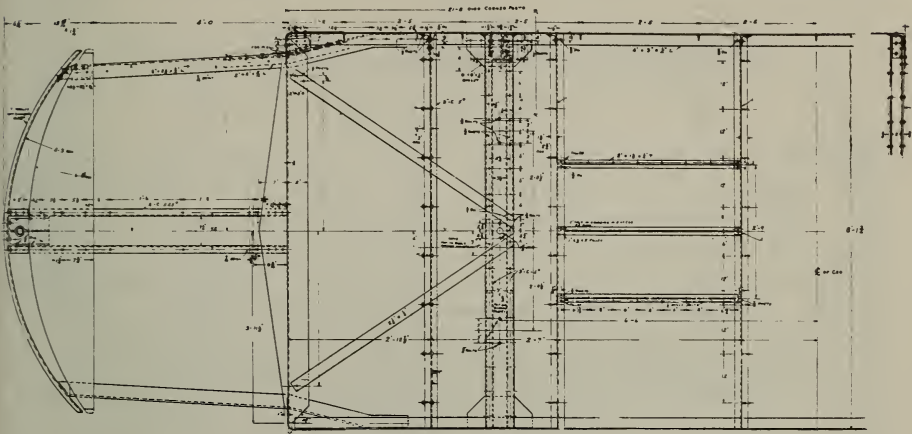
The cars furnished the company are erected on all-steel underframes and upperframes consisting of side plates, posts and carlines. In the underframe of the car side sills of 4 by 3 by $\frac{1}{4}$ -in. angles are used, the end sill being a steel plate pressed Z-shape, with legs of 5, $9\frac{1}{2}$ and 7 in. The crossings are 4-in. $5\frac{1}{4}$ -lb. channel and 3-in. 5-lb. channel, the bolster being built up of channels used to space top and bottom plates measuring 7 by $\frac{3}{8}$ in. From the bolster to the end sill extend, at

each end of the car, two diagonal braces made of $2\frac{1}{2}$ by $\frac{1}{4}$ -in. steel. The platform is hung on outside knees of 6 by $3\frac{1}{2}$ by $\frac{3}{8}$ -in. angle, reinforced where they are bent down under the end sill with 2 by 2 by $\frac{5}{16}$ -in. angle. In addition, two center knees of 4-in. $5\frac{1}{4}$ -lb. channel are used. In the upperframe of the car the side posts are $1\frac{1}{2}$ by $\frac{3}{16}$ -in. tees, and the carlines, which are $1\frac{1}{2}$ by $\frac{5}{16}$ in., extend from top rail to top rail. The belt rail measures 2 by $1\frac{1}{2}$ in. and the seat rail angle is 2 by $1\frac{1}{2}$ by $\frac{3}{16}$ in.

The vestibules of the car are arranged for double-end, pay-within operation, with a double-leaf folding door on each side of the platform, all doors folding out.



PREPAYMENT EQUIPMENT FOR UNITED TRACTION OF ALBANY. The vestibules of the car are arranged for double-end, pay-within operation with a double-leaf folding door on each side of the platform, all doors folding out



PREPAYMENT EQUIPMENT FOR UNITED TRACTION OF ALBANY. The interiors of the cars are neatly finished in cherry, the vestibules being made to match. The folding seat in each vestibule is one of the pleasing features, since it increases the apparent seating capacity of the car

In each vestibule is placed a folding slat seat of cherry, finished to harmonize with the interior finish of the car. All the vestibule sashes are single and are arranged to drop into pockets located between the dash and the inside lining. Sheet steel is used below the vestibule window rail, both inside and out.

The windows of the car are designed so that the upper sash is stationary, the lower sash being

arranged to raise not less than 26 in. The seats are all of the slat type with reversible backs, both backs and seats being of wood. On both sides of the car-body there is provided a wire mesh window guard extending the full length of the body and attached to the side posts so as to be readily removable. The roof of the car is of the Plain Arch type, supported by steel carlines bent to the proper shape.

Window glass is fastened in its sash at the Brill shops with a combination of putty and felt, the latter of course being used for its cushioning effect. The felt is used across the top and down the stiles to within two inches of the bottom of the sash, putty being used for the balance of the stiles and across the bottom. Thus the part of the window where water is apt to lie is protected with putty, so that there is no chance of the water getting into the car by capillary attraction, through the wick which the felt would form.

EQUIPMENT FOR GUAYAQUIL, ECUADOR

BRILL 21-E TRUCKS

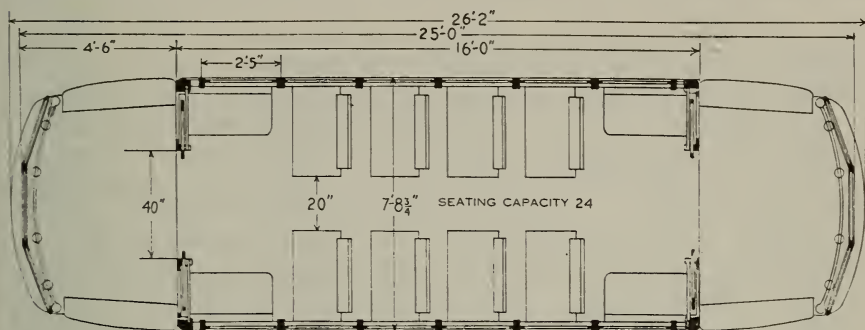
THE J. G. Brill Company has shipped to New York for export to Guayaquil, Ecuador, six 16-ft. closed motor carbodies, which are to be used on the lines of the Empresa de Luz Fuerza Electrica, of Guayaquil. The equipment is almost identical with an order previously built for the Quito Tramways Company, of Quito, Ecuador, which is about 300 miles from Guayaquil. Communication between these two cities was established in June, 1908, the intervening distance being spanned by a modern railway, known as the Guayaquil & Quito Railway.

Guayaquil, which is perhaps more properly Santiago de Guaya-

quil, is the capital of the province of Guayas. It is located on the Guayas River, about 33 miles above its entrance into the Gulf of Guayaquil. The population of the city is composed largely of half-breeds; and in 1900 it was estimated at about 55,000. The city is built on a comparatively level plain and it is practically at sea-level, averaging an elevation of only 30 ft. As a consequence, the lower portions of the city are partially flooded in the rainy season, lasting from January until June. The year is divided into two seasons—the wet and the dry. From January until June the days are scorching hot, but are broken



SINGLE-TRUCK CARS FOR GUAYAQUIL. The equipment is very similar to a previous order built for the Quito Tramways Company, of Quito, Ecuador, which is about 300 miles from Guayaquil



SINGLE-TRACK CARS FOR GUAYAQUIL. Height from track to underside of side sills, 25 $\frac{1}{2}$ in.; underside of side sills over trolley boards, 9 ft. 1 $\frac{1}{2}$ in.; height from floor to center of headlining, 8 ft. 2 $\frac{1}{2}$ in.; track to step, 13 in.; step to platform, 13 in.; platform to floor, 8 in.; weight of carbody, less electrical equipment, 4530 lb.; weight of electrical equipment, 1120 lb.; weight of truck, 5505 lb.; weight of motor, 2320 lb.; total weight, 13,475 lb.

up by nights of drenching rain. The mean annual temperature, however, hovers around 83 degrees Fahrenheit. The dry or summer season is generally considered as being very pleasant and healthy, despite the fact that during the other part of the year malarial fever has to be fought off.

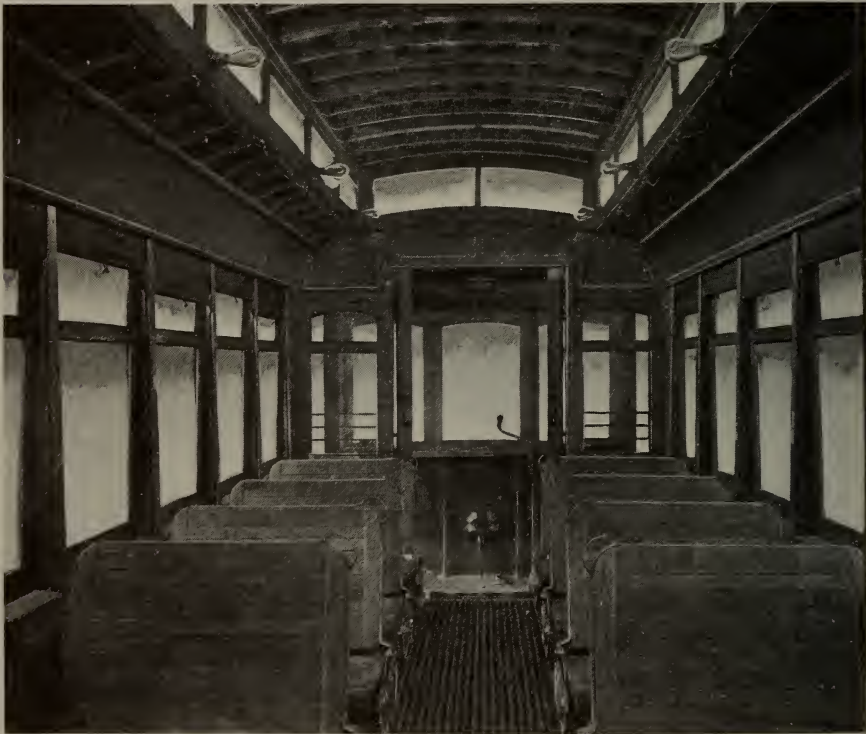
The old town is the upper or northern part and is inhabited by the poorer classes, its streets being badly paved and crooked. In 1896 a great fire destroyed a large part of the old town, and some of the unsanitary conditions were improved when the rebuilding took place. The new town, or southern part, is the business and residential quarter of the better classes. In this section of the city the buildings, which are of wood, are peculiarly built, the upper parts overhanging the walks and forming covered arcades. The city's water supply is brought in in mains from the Cordilleras, 53 miles distant. The mains pass under the Guayas River and discharge into a large distributing

reservoir on one of the hills north of the city. In addition to the tramway service rendered by the company to which the new cars have been shipped, the city has a good telephone service, the streets are lighted with gas and electricity, and telegraph communication with the outside world is maintained by means of the West Coast cable, which lands at the small port of Santa Elena, on the Pacific Coast about 65 miles west of Guayaquil. Steamboat connection also is had with the producing districts of the province on the Guayas River and its tributaries, on which boats run regularly as far up as Bodegas (80 miles) in the dry season and for a distance of about 40 miles up the Daule. For smaller boats there is a total of about 200 miles of navigation on this system of rivers. Naturally this aids trading and the exports of the province are almost wholly transported on these rivers and are shipped either at Guayaquil, or at Puna, its deep-water port, 6 $\frac{1}{2}$ miles outside the Guayas

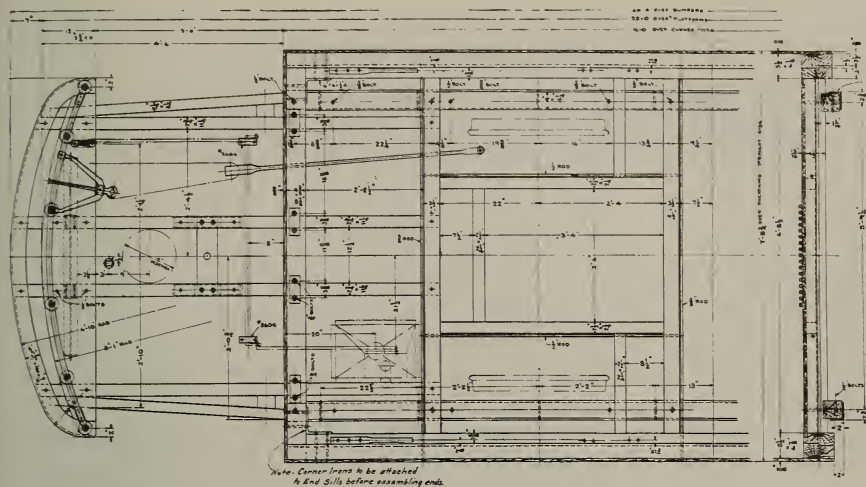
bar. The Guayas River is navigable up to Guayaquil for steamers drawing 22 ft. of water, but larger vessels anchor at Puna, where cargoes and passengers are transported to lighters and tenders. The riverfront has a quay, but the depth is only about 18 ft. The principal articles exported are cacao, rubber, coffee, tobacco, hides, cotton, nuts and Panama hats, cacao being the most important of the products. In the city there are some small industries, including a shipyard, sawmills, foundry, sugar refineries, cotton and woolen mills, brewery and

manufactures of cigars and soap.

The cars are erected on underframes in which the side sills are of long leaf yellow pine, $5\frac{1}{2}$ by $6\frac{7}{8}$ in. and the end sills are of oak, $4\frac{3}{8}$ by $8\frac{7}{8}$ in., the crossings also being of oak, $3\frac{1}{2}$ by 6 in. The corner posts are $3\frac{5}{8}$ in. thick and the sideposts are $1\frac{3}{4}$ in. thick. The body framing is built throughout with ash and yellow pine, the sides, which are straight, being sheathed with poplar. Each platform of the car is provided with a portable or removable vestibule and in addition Brill folding gates are provided. Each end of the



SINGLE-TRUCK CARS FOR GUAYAQUIL. The city is subjected to severe flood periods during the wet season, from January until June, the lower or business section of the city being damaged frequently



SINGLE-TRUCK CARS FOR GUAYAQUIL. The cars were designed so as to be easily knocked down for shipment

car has a dasher of sheet steel 2 ft. 9½ in. in height and the platforms have an iron dasher support on each side extending from the platform floor to the underside of the hood. There are six windows on each side of the car, with arched heads, the top sash stationary and the lower sash arranged to drop. The double sliding doors at each end of the cars are glazed in the upper panels and paneled below with ash.

The seats are of the Brill

Winner type, being made of ash slats. The longitudinal seats at the corners of the car occupy the space of one window and these, with the transverse seats on each side, give the car a seating capacity of 24 persons.

Other Brill specialties include the Brill Patented Angle Iron Buffer, Brill Radial Drawbar, "Dumpit" sandboxes and Dendenda Alarm Gongs. Brill 21-E Trucks, with a wheelbase of 6 ft. 6 in., are used under the car.

For many years oak crown pieces have been used, even with steel underframe construction. The reason for this design—which undoubtedly makes extra weight—is that the crown piece of wood forms a shock absorber which is a better resister to destruction by collision than is steel. A steel bumper is apt to bend out of shape in collision whereas if backed by a crown piece of wood the shock will be absorbed. Hence, in many cars steel bumpers, backed by wooden pieces, are used.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

POLICY AND PRINCIPLE

YOU never know where or when you are going to learn a big idea—one that makes you think. Not long ago I sat in a late night trolley car, talking to an old conductor. In the course of our conversation I mentioned to the conductor the much-used phrase, "Honesty is the best policy."

"Well," said he, "that may be; but my guide is this: 'Honesty is the best principle.'"

Just then the car stopped at my street and I arose to get off. As I stepped from the car the old conductor smiled at me and told me to think that statement over. I did think it over, and off and on I have been thinking of it ever since. Only today I looked up the meanings of the two words "policy" and "principle." Here is what I found:

Policy—Any system of administration or management based on self-interest as opposed to justice or equity. Wisdom or shrewdness in management.

Principle—Habitual devotion to right because it is right.

In other words, that man who practices honesty and fair dealing because it is a good policy does it because he is afraid of the consequences of any other practice. He is honest because it pays to be honest and not because his morals dictate an honest stand. He is a coward, practicing honesty not from a standpoint of its being nobler and greater, but because the final consequences of honest dealing pay him better. Compare that man with the "principle" man—the man who is honest because his heart tells him to be. That man who figures on no mercenary gain in being honest is *all man*. It is he who disregards policy and who fearlessly says that

"Honesty is the best principle."

JUST SIMPLE COURTESY

THE street car was hurrying downtown with its load of workers when a little old woman with a basket under her arm came hurrying to get aboard. As she was some distance from the corner when the car arrived she made a hopeless little gesture, apparently giving up the idea of catching the car. But the motorman, spying her, beckoned cheerily to her and again she hurried, this time catching the car. When

she got aboard the conductor quickly thrust aside the good-natured crowd and found for her a seat near the front. Then he took her fare and, reaching down, smilingly asked her where she wished to get off. She told him and the conductor went back to his post. A few squares further on the conductor walked back to the little woman, told her that the next square was hers and, taking her basket, helped her to alight. The passengers, standing back to let her off, had been impressed with her age and were watching her and the conductor closely. So they could not help seeing the old lady turn and hearing her fervent, "Thank you very much, sir." Nor could they help hearing the conductor's "'S'all right, lady—glad to help you." Everyone smiled—some smiled to see youth show age such courtesy—some smiled at the length of time which it took to take on and let off this one passenger. But others smiled (and *these smiles counted*) at the *courtesy* which meant *service*. They smiled in contemplation of the success of a transit company which had such representatives as this motorman and this conductor.

"BULL"

SLANG has done much *to* our language and, in some cases, it unquestionably has done much *for* it. But one of the most striking examples of hurt that has been done by slang, not only to the English language but also to all men understanding that language, is a little word of four letters—"Bull." The popularity of this wide-flung little bit of slang at first was hindered by the very nastiness of the word; then the meaning became more general—broadened out—until now it cannot be denied that it is not only widely understood but widely used. So much for its origin and lightning growth in popularity. What of the hurt it does? Simply this—there are many men with whom the expression has become entirely too pat. It rolls off their lips like water from a duck's back. And it flies to their lips—or at least to their brains—in a flash when those lips should be voicing or that brain thinking serious thoughts. Many are the subordinates who nowadays listen to a few well-chosen, carefully-prepared words of advice—words that should strike home to them with a punch—and then walk away murmuring under their breaths, "Bull." Give a man a pat little word like this, with its terribly broad scope, and a great deal of his mental machinery can be thrown out of whack very easily. If the word did not exist, the thought probably would not; or if the thought unfortunately did exist it could not find such an easy outlet, such a ready expression, as is the case now that this little word has swept us so far off our feet. Let's not try to advocate the wiping of this word from the mother tongue; let's simply say to ourselves that we shall hesitate before using it each time we find ourselves thinking in terms of "Bull."

SCHOOL JANITORS AS TRAFFIC POLICEMEN

RAILWAY managers everywhere should be interested in a movement set going in Louisville, Ky., to have janitors of public schools authorized to serve as traffic policemen while the school children are going to and coming from school. The Board of Education and the Board of Public Safety have decided to try out the plan at four schools throughout the city, the traffic conditions at each school being typical. The plan will be put in force shortly and will continue until the close of the school year, when results will be checked up and a final decision made on its practicability. It is intended that should the experiment prove successful the system will be extended to all schools where passing vehicles form a menace to the pupils. In Lexington, Ky., the Commission of Public Safety has ordered traffic policemen to stand near two of the public schools during the recess periods and during the time when the school is being closed in the afternoon. It would seem that a great deal of good along the lines of safety could be accomplished by similar co-operation of railway managers with city, school and police authorities.

Friction has been labeled the white plague of the business world, and there is nothing that produces friction so surely as does lack of harmony and absence of co-operation. Therefore, why not co-operate?

THE BIG-COMPANY MAN

IT would be hard to tell just what the man working for a large company and caring for nothing but his personal job can be expecting in the way of success. Such a man does not come within a city block of his duty to himself and his employer; how he possibly can hope for success is a deep mystery. A man must take an interest in the welfare of his company; he must do his little share toward the success of the company if he is hoping for success. But he must go farther than this. Once he has firmly implanted in him the idea of boosting things along as well as he can he must learn something about his company's business methods so that he intelligently may pursue his ambition. Then and then alone will he be sure his efforts are heading toward success.

CHANGES OF ADDRESS

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



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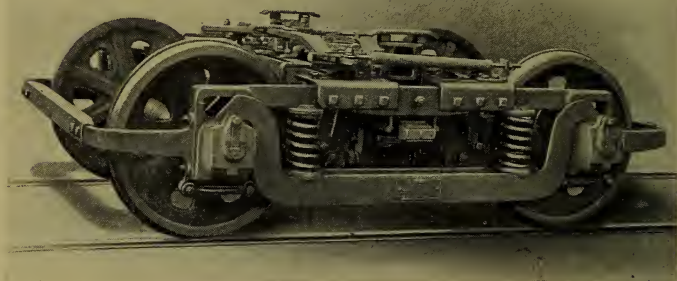
AUSTRALASIA—Noyes Brothers, Melbourne, Sidney, Dunedin, Brisbane, Perth

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ARGENTINE AND URUGUAY—C. S. Clarke &
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COLONY—Thomas Barlow & Sons, Durban, Natal

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BRILL 27-M.C.B. TRUCK

EXTENDED experimentation and wide experience with all types of construction have shown conclusively that the truck with the solid-forged side frames is the only truck that will maintain its squareness and provide security against deterioration and frequent trips to the shops for repairs or adjustment. These solid-forged frames—frames in which the pedestals are an integral part of the forging—are exclusively Brill features. They are used on all Brill trucks but perhaps on no other truck is their use so important as on the 27-M.C.B. The motors of the 27-M. C. B. necessarily must be powerful; it is in taking care of the torque of these motors, the heavy strains of rapid brake application while running at high speed and the corner thrust in taking curves that the solid-forged side frames play such an important part. The solid-forged frames spell safety, efficiency and economy. They are guaranteed absolutely against breakage except if caused by collision or derailment.

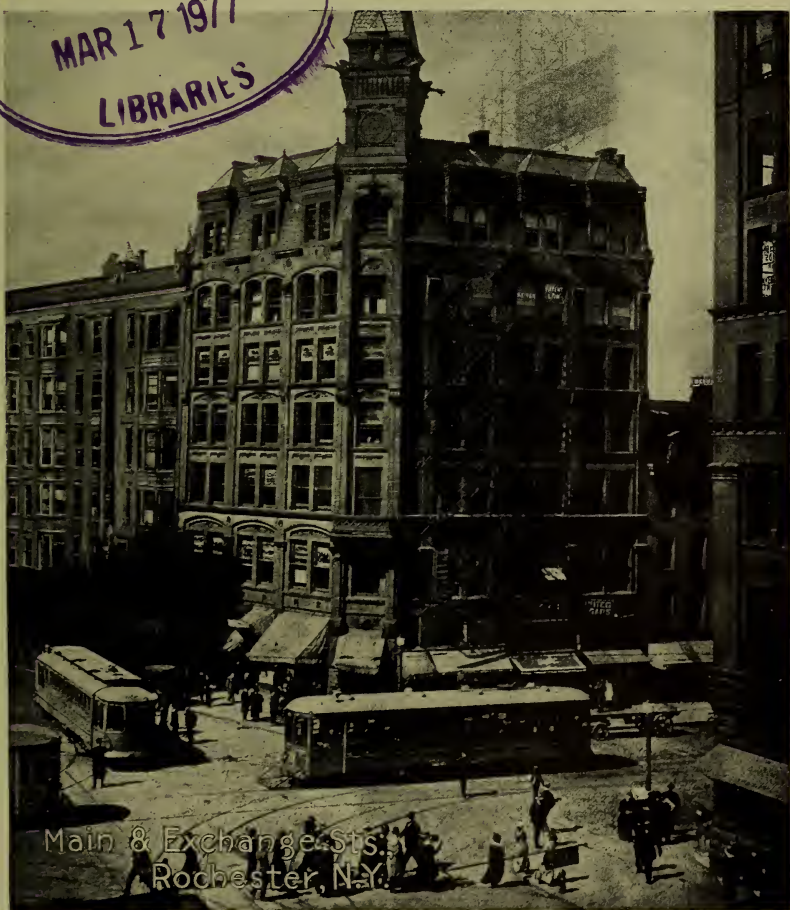
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BRILL EXHAUST VENTILATOR

THE subject of proper car ventilation is one in which, perhaps more than any other, the riding public shows a deep interest. Even during these hot summer days, when the passenger wants every breath of air he can get, it is sometimes necessary to close the windows up tight to shut out a shower; unless the car is properly ventilated it is apt to become objectionably stuffy during these wet-weather periods, incoming passengers bringing wet, steaming clothes and outgoing passengers taking with them an uncomfortable, choky feeling, if not a positive "grouch" at the equipment of the company. Brill Ventilators do not produce draughts or unduly reduce the temperature; they exclude rain and snow, remove vitiated air, at the same time drawing into the car, in its place, plenty of fresh air, and they operate with a minimum of attention from crews.



Alvarez

ADMINISTRATOR GENERAL, ANGLO-ARGENTINE TRAMWAYS CO., LTD.

Service

The reward of service is more service.

When a man once wraps his mental lines firmly about that axiom he is on the tow-path to success. The force of the idea alone, if firmly believed in, would seem capable of taking a man at a pretty fair pace through life. If a man becomes so engrossed in his work, his profession, that he wants no greater reward than to be given more work to do, surely definite and undeniable success is shining but a short distance up ahead of him.

A man not interested in the service from which his life is being spun out cannot come within a thousand leagues of success except by the merest chance. It is the man honestly in love with the service allotted to him as his share of the world's milling who drains from life a steady flow of happiness—happiness attained directly through the achievement he cannot help but make.

The grumbler, the discontent, has no place in the same breath with the man who loves his work. The future of the former is blank, dismal, more than uncertain; that of the latter is bright and potent.

No great thing in this world of ours has been accomplished except it be by someone so thoroughly wrapped up in his work as to be a part of it, to live for it and in it. The secret of success would seem to be service.

JUNE 15, 1916

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GIUSEPPE PEDRIALI

GIUSEPPE PEDRIALI was born in Forli, Italy, May 24, 1867. He took the diploma of Mechanical Engineer (Ingeniero Mecanico é Industrial) in Turin in 1890, and in 1892 he received the diploma of Electrical Engineer (Ingeniero Electro-tecnico) in Liege, Belgium. He began his work as Engineer in the works of La Societe Electricité Hydrique "Julien Dulait", at Charleroi, Belgium, in February, 1893. In September of the same year he entered the electric railway field, being appointed an engineer in the company "Les Tramways Bruxellois", where he was engaged from its start in the electrification of the system. Ultimately he became Chief Engineer of the company. He remained in Brussels until February, 1907, when he joined the Cia. Generale des Tramways de Buenos Aires and went to Buenos Aires to represent the company. In February, 1908, he became Director General of the Anglo-Argentine Tramways Co., Ltd., which company, during his administration, has absorbed seven different tramway companies operating in and around Buenos Aires and is now one of the largest tramway companies with a total route mileage of more than 380, having in service 1850 electric cars and annual receipts of approximately \$14,000,000. He was the promoter of the subway railways in Buenos Aires, the concession for which he obtained in 1909. The first line of this kind was inaugurated in 1913, running from the Plaza Mayo to the Plaza Once de Septiembre. At the time these subway concessions were obtained all the concessions of the various surface line tramway companies absorbed by the Anglo-Argentine were unified and this large undertaking now has some eighty years of concessions to exploit.

INTERURBAN CENTERS AND INTERURBAN CARS

ROCHESTER



ROCHESTER, seat of Monroe County, New York, is situated on both sides of the Genesee River, about seven miles from its mouth, and is about seventy miles northeast

of Buffalo and two hundred thirty miles west of Albany. Its situation within seven miles of a lake port (Charlotte, located at the mouth of the Genesee), and the fact that it is served by the Erie, Pennsylvania, Lehigh Valley, West Shore, Buffalo, Rochester & Pittsburgh, and the New York Central & Hudson River Railroads, have aided in the advance of the city, and it has spread until it now covers an area of nineteen square miles and its population has grown to a total of about 250,000.

Although Rochester well may be said to be primarily a manufacturing city, it is nevertheless the distributing centre for a highly productive agricultural section, the country surrounding the city being rich in its resources and also being highly cultivated and the territory is comparatively dense in population, a feature which of course works to the very great advantage of the interurban electric railways operating into and out of the city.

The Genesee River runs through the heart of the city, cutting it into

equal parts. It flows through a deep gorge, the height of the bank ranging from 50 to 200 ft. The Erie Canal runs through the heart of the city, being carried over the river by a stone viaduct 850 ft. long and 45 ft. wide. The river furnishes the city with exceedingly cheap power, one perpendicular drop of 96 ft. being right in the heart of the city. From the city limit the river falls 236 ft. in its seven-mile course to the lake. Ten bridges, road and railway, connect the two sides of the river.

The city is very attractively built, with many fine avenues. The park system, planned by Frederick Law Olmsted, comprised 1,264 acres in 1908. The largest parks are Eastman Durand (512 acres, located on Lake Ontario); Genesee Valley Park (443 acres, located on both sides of the river); Seneca Park (212 acres, with a zoo); Highland Park (75 acres) and about eleven other smaller ones.

A number of large educational institutions are located in Rochester, some of them sectarian. Also there are quite a few institutions of other sorts, the Western New York Institution for Deaf Mutes, the Monroe County Penitentiary, a state arsenal and a state hospital for the insane being among the number.

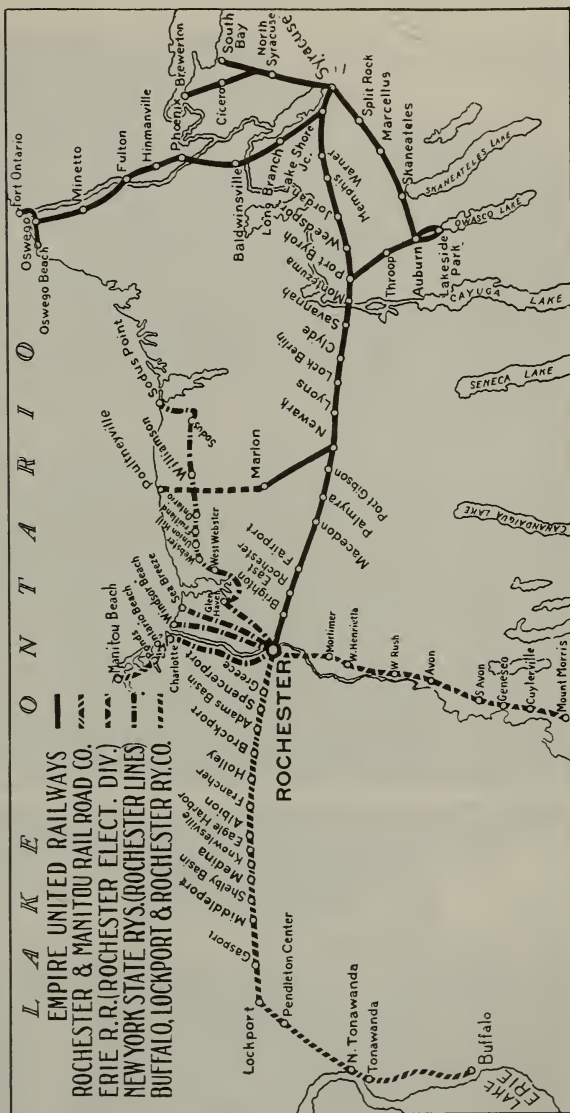
The falls of the city make power abundant and therefore cheap and as a consequence manufactures

flourish. Clothing, boots, shoes, cigars, machine shop products, furniture, wagons, malt liquors, flour and photographic supplies being the most important. The industries of the city (the majority of them situated along the river) have suffered severely from time to time because of disastrous floods caused by the narrowness of the gorge. In 1865 property damage to the extent of \$1,000,000 was done and in 1902 it amounted to \$1,500,000. On March 30 and 31, 1916, the height of the water in the river exceeded all previous marks by from five to six inches, but the property loss was almost negligible owing to improvements in flood walls that have been built within the last few years.

The first settler dates back to 1788, but it was not until 1810 that permanent settlement began. In 1834 the city was incorporated, and from then on it has steadily increased in population, wealth and importance. Between 1880 and 1890 the population increased from 89,366 to

133,896, and from 1900 to 1910 it increased from 162,608 to 218,149.

The interurban electric railway system of Rochester is very extensive and serves a very large number of people. It is provided by





Syracuse Terminal

EMPIRE UNITED RAILWAYS
Standard station, Oswego Division

Shops at Lakeland, N. Y.



INTERURBAN CENTERS AND CARS. Standard train of Empire United Railways

the Buffalo, Lockport & Rochester Railway Company, the New York State Railways, the Empire United Railways, the Rochester electrification of the Erie Railroad and the Rochester & Manitou Railroad Company.

The Buffalo, Lockport & Rochester operates between Rochester and Buffalo, running through Lockport and entering Buffalo over the tracks of the International Railway Company. At the Lockport city line the cars are taken over and operated by the International into

Buffalo. Running in the other direction (from Buffalo to Rochester) the cars are driven over the company's own tracks from Lockport



INTERURBAN CENTERS AND CARS. Standard sub-station of Empire United Railways



INTERURBAN CENTERS AND CARS. Car barn at Lakeland, Empire United Railways

to Rochester, a distance of fifty-eight miles. Entering Rochester the company uses the tracks of the New York State Railways, the cars being manned by New York State crews at the city line.

An hourly schedule is maintained by the company, extra cars quickening this service to half-hour schedule during the rush hours of the morning and afternoon, these extra cars running from Rochester seventeen miles out to Brockport. The total population tributary to the lines is estimated at about 290,000.

For the operation of its lines the company purchases its power from

the Niagara, Lockport & Ontario Power Company, of Buffalo, transmitting the current at 60,000 volts and stepping it down to a line voltage of 600, substations being located about every ten miles along the company's lines.

Freight forms a considerable portion of the business done by the company, through and local freight being handled in less carload lots and carload lots being shipped between Lockport and Rochester and to points on the B. R. & P. In addition, the company handles Wells-Fargo Express. The road-bed is constructed on private right-of-way outside of the cities, permitting of a high rate of speed, the maximum being about fifty miles per hour. The latest statistics of the company's operation show a total of 2,033,749 passengers carried, with a car mileage of 1,474,750 and a total of 4,616 tons



INTERURBAN CENTERS AND CARS. Buffalo, Lockport & Rochester car house and repair shop

of freight handled.

The Erie Railroad's Rochester Division, which is an extensive electrification, forms one of the most important parts of Rochester's interurban system. The total tributary population of this line has been estimated at 350,000. This total includes the towns of Avon, Geneseo and Mt. Morris. Power for the operation of this line is purchased from the Niagara, Lockport & Ontario Power Company, being transmitted from Niagara at 60,000 volts and stepped down to a line voltage of 11,000, the company having a substation at Avon.

The total trackage of the company is 34 miles, all single-tracked and laid on private right-of-way. The company operates six cars which measure 40 ft. over the bodies and 53 ft. 3 in. over all and has two others which measure 55 ft. over the bodies and 67 ft. 3 in. over all, the former having a seating capacity of 54 and the latter seating 68. The smaller car weighs, fully equipped and mounted on its trucks, 96,000 lb., and the latter weighs 117,000 lb. The cars are built for double-end operation on



INTERURBAN CENTERS AND CARS. Buffalo, Lockport & Rochester noseplow

composite and steel underframes, the side construction being of wood. Fare collection is made by tickets sold by agents. The cars are run both single and in trains. Miscellaneous freight and express business is conducted and forms a considerable part of the company's business. A maximum speed of 55 miles per hour is attained, the maximum number of stops being one to the mile.

The New York State Railways—Rochester Lines—operates two in-



INTERURBAN CENTERS AND CARS. Dispatcher's and ticket office at Albion, N. Y.—Buffalo, Lockport & Rochester



INTERURBAN CENTERS AND CARS. Bridge at Ashantee, one mile east of Avon—
Erie Railroad

terurban divisions, one formerly the Rochester & Eastern Rapid Railway, running from Rochester to Geneva, and one, formerly the Rochester & Sodus Bay Railway, running from Rochester to Sodus Point. Geneva, the eastern terminus of the Rochester & Eastern Division, is on Seneca Lake and has a population of about 13,500. Sodus Point, the eastern terminus of the Rochester & Sodus Bay Line, is on Lake Ontario at the mouth of the Sodus Bay, and, although the winter population is only about 250 to 300, in summer it ranges from 500 to 1,000. The Rochester & Eastern also passes through Pittsford, Victor and Canandaigua, having populations of 1,500, 1,000 and 7,500 respectively. The Sodus Bay Line passes through Webster, Will-

iamson, Ontario and Sodus with populations of 1,200, 1,200, 600 and 1,700 respectively. Sodus is the terminus of a majority of runs on this line during the winter, but in summer practically all trains run to Sodus Point, particularly on Saturday, Sundays and holidays. The total tributary population of the two lines is estimated at approximately 350,000.

The Rochester & Eastern has a total single-track mileage of 44.51 miles, with 2.98 miles of double track. The major portion of this line is on private right-of-way, but 3.57 miles being on highways outside of cities and villages. On the other hand, the Sodus Bay Line, with a single-track mileage of 44.46 miles and 4.25 miles of double track, has but 10.44 miles on

private right-of-way, the balance being on streets and highways.

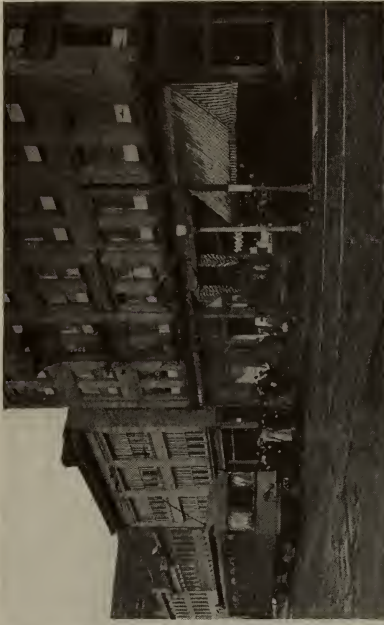
The company operates with Niagara power purchased through the Rochester Railway & Light Company. The transmission line voltage on the Rochester & Eastern is 16,500 volts; on the Sodus Bay Line it is 11,000 volts, and the trolley voltage is 625 on both lines. Substations on the Rochester & Eastern are located at Pittsford, Victor, Canandaigua and Gates, Canandaigua also being a standby steam plant used in case of interruption on the Niagara line. On the Sodus Bay Line stations are located at Float Bridge, Ontario and Sodus, with storage batteries at Williamson and Webster—a standby steam plant being maintained at Float Bridge. The overhead trolley is used exclusively.

Several types of cars are operated on these lines, the most modern car on the Rochester & Eastern being a semi-steel arched roof, steel underframe single-end car. The length over all is 52 ft. 4 in.; width 8 ft. 9 in.; length inside, 41 ft. 4 in.; seating capacity, 52. The Sodus cars are all double-end, the latest type of equipment, purchased in 1910, being wood construction; length over all, 51 ft. $3\frac{7}{8}$ in.; width 8 ft. $6\frac{1}{2}$ in.; length inside, 40 ft. $3\frac{5}{8}$ in.; seating capacity, 52. The weight of the car complete is 68,230 lb.

On fare collections, regular steam road practice is followed, one-way and round-trip fares being on the basis of two cents per mile, the cash fare rate on the car the same as the ticket rate. Fifty-four and forty-six trip commutation tickets are



INTERURBAN CENTERS AND CARS. Electric train opposite Avon (N.Y.) station
Erie Railroad



Interurban terminal, Rochester
Combination passenger and express car



Typical steel passenger coach
Main and Clinton Streets, Rochester

NEW YORK STATE RAILWAYS

sold at considerably reduced rates. Penny coupon books covering transportation value of \$12.00 and \$6.00 are sold at reduced rates of \$10.00 and \$5.00 or $\frac{5}{6}$ of the regular fare.

Freight business is subject to Official Classification with exceptions. Exceptions apply to such shipments as could not be conveniently handled at stations or on cars, the greater part of the business being less than carload shipments. Where

foreign carload shipments are moved on the line a switching charge is made.

Rochester & Eastern cars are equipped with multiple-unit control and are operated in two-car trains at such times as traffic may warrant. Cars on the Sodus line are not operated in trains. Nineteen cars are used in normal operations on the two lines, with a total of thirty-five available for service. The maximum time-table speed is 24 miles per hour, with an average of one stop per mile on the Rochester & Eastern and one and six-tenths stops per mile on the Rochester & Sodus Bay Line.

The traffic statistics for the year ending December 31, 1915, were: Rochester & Eastern Division—passenger earnings, \$258,676.91; car miles, 604,613; passengers carried,



INTERURBAN CENTERS AND CARS. Automatic signals at Victor—New York State Railways

1,373,797; express earnings (both lines), \$37,078.99; Rochester & Sodus Bay Division—passenger earnings, \$165,120.92; car miles, 506,783; passengers carried, 1,095,757.

Transfer connections are made with other roads as follows:—at Geneva, New York Central, Geneva & Auburn (electric) and Lehigh Valley; at Seneca Castle, Pennsylvania Railroad; at Victor, Lehigh Valley Railroad; at Pittsford, New York Central Railroad; at Rochester, New York Central Railroad, Erie, Lehigh Valley, Pennsylvania, Buffalo, Rochester & Pittsburgh, Buffalo, Lockport & Rochester (electric) and Rochester, Syracuse & Eastern (electric) railways; at Wallington, Pennsylvania Railroad. Connections at Seneca Castle, Victor and Pittsford are interchange connections.



INTERURBAN CENTERS AND CARS. Rochester and Eastern Division, New York State Railways

The Empire United Railways has three divisions—the Rochester-Syracuse Division, the Syracuse-Oswego Division and the Auburn-Port Byron Division. The terminal cities other than Rochester have populations as follows:—Syracuse, 150,000; Oswego, 25,426; and Auburn, 32,468. Other towns of considerable size are Fulton, 11,138; Lyons, 4,742; Newark, 6,468; Baldwinsville, 3,220; East Rochester, 3,471; Fairport, 3,556; and fifteen others ranging from 3,000 to 200. These cities and towns give the system a total tributary population of 550,000. The company operates a total of 103 miles of single track and 140 miles of double track.

Connections, in addition to those made in Rochester, are:—at Newark, P. R. R. and Newark & Marion

Railway; at Lyons, New York Central, Pennsylvania Division; at Weedsport, Lehigh Valley Railroad; at Syracuse, Syracuse & South Bay Electric Railroad, Auburn & Syracuse Electric Railroad, Syracuse & Suburban Railroad, New York State Railways' Oneida Lines, New York Central Lines, and D. L. & W. R. R. That these connections mean much to the company is readily apparent.

The power for the operation of the lines of the company is purchased from the Niagara, Lockport & Ontario Power Company, steam plants being located at Lyons and Auburn and hydro plants at Minetto and Salmon River. Transmission of current from Salmon River is at 60,000 volts and from Minetto at 33,000. The operating

voltage on the a.c. side is 33,000 and on the d.c. side 650, substations being placed at Lakeland, Phoenix, Fulton, Oswego, Peru, Port Byron, Savannah, Lyons, Port Gibson, Macedon and East Rochester.

The standard car in use by the company measures 56 ft. 3 in. in length, 8 ft. 8 in. over side sheathing and has a seating capacity of 58. The car weighs 87,000 lb. fully equipped and mounted on its trucks. It is built on a composite underframe and designed for double-end operation. Freight and express are handled by the company, less than carload lots being carried ordinarily. Highways are not used on any part of the lines of the company, and this fact, together with the small number of stops per mile (the average is 1.2) make rapid service possible and 65 miles per hour is attained by the company's trains. Ordinarily thirty cars are required for the maintenance of the company's schedules, but there is a total of thirty-eight cars and three parlor cars available for use.

The line of the Rochester & Manitou Railroad begins in what was the village of Charlotte, now part of the city of



INTERURBAN CENTERS AND CARS. Passenger, freight and sub-station at Pittsford, N.Y.—New York State Railways

Rochester, at a point known as Ontario Beach. After making a slight detour, it runs along the shore of Lake Ontario westward to Manitou. The territory traversed is generally low and level, there being but four short grades of about 3 per cent. encountered on the entire line, these being at Charlotte. After leaving Charlotte the entire lake shore is occupied by summer cottages, forming a single row between the lake shore and the company's line. The road crosses the different ponds and bay on low wood trestles. The trestle across Braddock's Bay,



INTERURBAN CENTERS AND CARS. Ontario sub-station of New York State Railways



INTERURBAN CENTERS AND CARS. Braddock's Bay trestle, nearly 3000 ft. long—
Rochester & Manitou Railroad

including a concrete viaduct at each end, is about 3,000 ft. long. The beach between Charlotte and Manitou affords excellent bathing and the ponds and bay afford excellent fishing and boating during the summer and wild fowl hunting during the fall and early winter.

Ontario Beach, at the Charlotte terminal, is an amusement resort which has been well patronized in

the past and which furnishes a considerable transient patronage to this road. Manitou Beach is a purely recreation resort with a large colony of summer residences and is patronized largely by camping parties. In some instances, the line runs very close to the lake, so close in fact, that in the spring of 1909, during a period of high water and stormy weather, it met with

disastrous results. That part of the line running from Rochester to Ontario Beach is the Lake Avenue line of the New York State Railways. Passengers going to Manitou from the central part of the city use this line and transfer to the Manitou cars at Ontario Beach.

The Manitou road



INTERURBAN CENTERS AND CARS. Typical train operated on regular schedule during summer months



INTERURBAN CENTERS AND CARS. New trestle at Manitou

does not operate during the winter months. During mid-summer, trains are operated on a regular schedule with a headway of 25 minutes. Block signals are used, the signal system being augmented by a telephone system, both systems under the control of a dispatcher at the Charlotte terminal. Each block covers about $1\frac{1}{2}$ miles.

The equipment of the company consists of six motor and eleven trail cars. On Sundays and holidays this entire equipment is put into use, but for regular weekly schedules only four motor cars are required in the morning, these being supplemented by four trail cars in the afternoon and evening. The line of the company is on private right-of-way for prac-

tically its entire length. Maximum speed is 20 miles per hour, with an average of three stops per mile.

The motor cars are divided equally, as to type, between a center-aisle, open-vestibule type built by the G. C. Kuhlman Car Company and described in BRILL MAGAZINE for June, 1912, and the semi-convertible type, arranged for double-end operation.



INTERURBAN CENTERS AND CARS. Station at Manitou

SEMI-CONVERTIBLE PREPAYMENT CARS FOR HERSHEY, PA.

BRILL 27-M.C.B. TRUCKS

HERSHEY, Pa., one of the most unique towns in the world, recently has had its transit service augmented by the receipt of two 30 ft. 8 in. Semi-Convertible prepayment cars, the product of The J. G. Brill Company's plant. These cars are very similar in design to the type of an order previously built for the Hershey Transit Company, which cars have been rendering very satisfactory service, as is shown by the repetition of the order.

Hershey is a typical one-man town, which has been remarkably progressive and thriving. Its chief industry is the Hershey Chocolate Company, which, with its allied interests, employs about three thousand persons. This plant consumes an average of 75,000 quarts of milk daily, which milk is collected from the farming districts of Dauphin,

Lebanon and Lancaster Counties. This requirement of daily collection and delivery of milk, with the transportation of employes, has made the transit lines an important part of the development of the town. A model community has been built up about the plant, the construction of every building being overseen by a competent architect and the furnishing of all the advantages of a modern city being given careful consideration.

Besides its industrial growth, which has been along steady, well-defined lines, the social side of the life of Hershey's inhabitants has been given attention. The town has become a magnet for tourists, because of its unusual features and unique founding and government. Attached to the town is a most complete park with large free private zoo. The town has two theatres



SEMI-CONVERTIBLE CARS FOR HERSHEY. These cars are somewhat similar to equipment previously built for this company. They will be used on the lines of the Hershey Transit Company, operating through "Chocolatetown" and its environs.

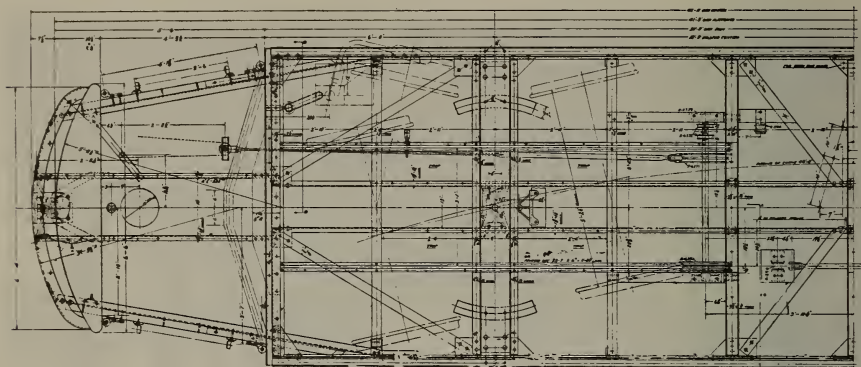


SEMI-CONVERTIBLE CARS FOR HERSHEY. The use of the Brill Semi-Convertible window system is one of the best features of the cars. The sashes are arranged in tandem, according to the standard construction, and are built to raise into pockets in the roof

and a convention hall which will hold ten thousand. In addition, it is planned to build within the current year a large social center building covering nearly 90,000 square feet and five stories in height and containing practically every conceivable public convenience, including a music hall and a modern hospital. Throughout the whole year public entertainments are scheduled, and the transit officials find that this helps make a constant movement of travel in addition to the usual transportation. A park placed at the top of a hill and overlooking a wide view is in process of development, and it

is also planned to build a million dollar hotel on this site.

The development of the transit system of Hershey is equally as interesting and impressive as the development of the town itself. Every attention was devoted to establishing and maintaining a reputation for comfort, easy riding and prompt and efficient service. The company, like the town, is of comparatively recent growth, the town having been founded in 1903 and the transit company following soon after. The Hummelstown & Campbelltown Street Railway Company was incorporated March, 1903, and was open for traffic be-



SEMI-CONVERTIBLE CARS FOR HERSHEY. Length of body over corner posts, 30 ft. 8 in.; length over platforms, 41 ft. 8 in.; length of platforms, 5 ft. 6 in.; centers of side posts, 2 ft. 8 in.; width over sills including sheathing, 8 ft. 3½ in.; height from track to under side of side sills, 2 ft. 8¾ in.; height from floor to center of side sills over trolley boards, 9 ft.; height from floor to center of headlining, 7 ft. 10½ in.; track to step, 15 in.; step to platform, 14½ in.; platform to floor, 10½ in.; weight of carbody less electrical equipment, 18,700 lbs.; weight of electrical equipment, 1,600 lbs.; weight of airbrake equipment, 1,200 lbs.; weight of trucks, 14,100 lbs.; weight of motors, 11,200 lbs.; total weight, 46,800 lbs.

tween Hummelstown and Palmyra in October of the following year. At that time the equipment of the company consisted of three double-truck Brill Semi-Convertible cars, the power being furnished by the Hershey Chocolate Company. The extension to Campbelltown, a distance of about 4 miles, was opened for traffic in January, 1908. The Lebanon & Campbelltown Street Railway Company, 10 miles in length, was incorporated in August, 1911, and was opened for traffic in February, 1913. The entire trolley system was merged into the Hershey Transit Company in December, 1913. The Deodate & Hershey Street Railway Company and the Deodate & Elizabethtown Street Railway Company, about 10 miles in length, were opened for operation in 1915 and also were merged with the Hershey Transit Company. The latter line connects at Elizabethtown with the Conestoga Traction Company, connect-

ing Lancaster with Hershey direct and making connections at Lancaster to all parts of Lancaster, Chester and Berks Counties. Thus the residents of Hershey and the surrounding towns are given direct trolley service to Philadelphia. The Hershey Transit Company profits considerably through an arrangement with the Conestoga Traction Company whereby cars are run through to Lancaster without change for special picnic and private parties.

The present rolling stock, including the new cars, is made up of fourteen double-truck Semi-Convertible Brill cars, two single-truck cars, two single-truck open cars, four milk cars, and snow-fighting apparatus consisting of a sweeper and a plow. During the last year a high-tension line and substation were constructed, and at present a car barn with capacity of forty cars is being erected.

The cars are erected on steel

underframes in which the side sills are made of 5/16 by 18 in. steel plates, reinforced on the top with a 3 by 5/8 in. plate and at the bottom with a 2 1/2 by 2 1/2 in. angle. The end sills are of 10-in. channel, the stringers of 4-in. channel and the crossings of the same dimension, the inside platform knees being also of the same dimension, the outside knees being 6-in. channel. In the body framing of the cars the corner posts are 2 3/8 in. and the sideposts 2 1/4 in. thick, the posts being set with a sweep of 1 5/8 in.

The roof is the standard construction of The Brill Company, being of the Brill Plain Arch type, supported on concealed steel carlines, forged to the shape of the roof, with a foot at each end, which foot is fastened to the top rail. Six Brill Exhaust Ventilators, three placed down each side of the car, are provided. The hoods, made of the same material as the rest of the roof, are detachable.

The platforms are not separated from the body of the car by either end doors or bulkheads. The step openings are enclosed with Brill four-part folding doors, made in two sections, one section folding against the corner post and the other section folding against the vestibule post. The platforms are round end, sheathed below the windows with wood and each vestibule is made with three windows, the sash being arranged to drop and the center window provided with a rack to hold the sash at various heights. In the body of the car there are eleven windows on each side, being arranged with double sash, the lower one hinged to the upper one and both arranged to slide into roof pockets, according to the Brill Semi-Convertible Window System.

Other Brill specialties provided include "Winner" seats, "De-denda" alarm gongs, and Brill patent signal bells.

The number of inquiries recently received in regard to the use of 24-in. wheels indicates very plainly that wheels of that dimension are receiving more than passing attention by the electric railway field. They have certain very apparent advantages:—they reduce the car height above the track, thus eliminating one step and making for safety and convenience in loading and unloading; they weigh less and consequently much smaller motors may be used with them. They can be applied to the Radiax, 21-E, 39-E, 77, and 27-M.C.B. Trucks, showing the belief of The Brill Company in their efficiency for city service—and perhaps more especially for center-entrance cars.

OPEN TRAIL CARS FOR GUADALAJARA, MEXICO

BRILL 57-D TRUCKS

THE American Car Company recently has shipped to the Cia. Hidro Electrica E Irrigadora Del Chapala, S. A., of Guadalajara, Mexico, five 25-ft. open trail cars mounted on Brill 57-D Trucks. The delivery of these cars was delayed because of

of Jalisco, is located about 275 miles northwest of the federal capital. In 1900 the census returns gave the city a total population of 101,208, this being an increase from a population of 83,934 in 1895. The city is located in the Antemarae Valley near the Rio



OPEN TRAIL CARS FOR GUADALAJARA. The placing of the seats back to back is one of the unusual features of this car. Although of the open type, entrance and exit are possible only at the platforms, the sides being enclosed with a screen guard and access to the seats being possible only through the center aisle. However, conversion into the well-known running-board type of car is easy, it being necessary merely to remove the safety screen and to apply running-boards

the unrest in Mexico, which made it impossible to get them through to Guadalajara. Shipment was from New York to Vera Cruz and thence by rail to Guadalajara and for some time it was impossible to obtain safe transportation from the coast to the interior, the American occupation of Vera Cruz and the internal revolutions causing the blockade.

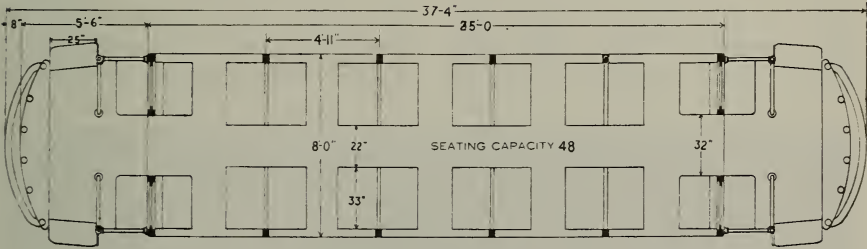
Guadalajara, an inland city of Mexico and the capital of the state

Grande de Santiago, about 5,100 ft. above sea level. Hence, although subject to sudden changes, its climate is for the most part dry, mild and healthy. Guadalajara is a progressive city, its streets being well planned and well paved, and the city has numerous plazas, public gardens and shady promenades. It is served by a short branch of the Mexican Central Railway from Irapuato. For its public service, both tramway

and electric lighting system, the Juanacatlan falls of the Rio Grande, located near the city, furnish the electric power.

Guadalajara is an episcopal see and its cathedral, built between 1571 and 1618, is one of the largest and most elaborately decorated churches in Mexico. One of the most popular public resorts of the city is the Paseo, a beautiful drive and promenade extending along both banks of the Rio San Juan de Dios for about a mile and terminating at the Alameda, or public

The city was founded in 1531 by Nuno de Guzman and became the seat of the bishop in 1549. It has figured more or less prominently in the history of the country, having been the stage of several conflicts during the recent disturbances in Mexico. The Calderon bridge near the city was the scene of a serious defeat of the revolutionists under Hidalgo in January, 1911. Earthquakes from time to time have caused damage to the city, the most noteworthy being the severe 'quake of May, 1818,



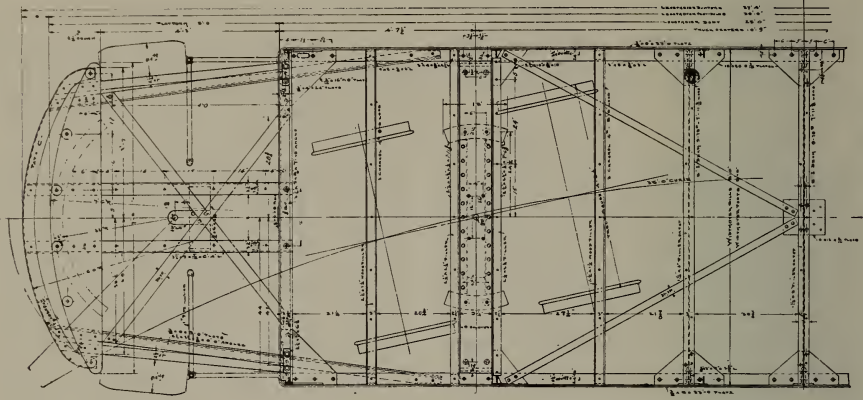
OPEN TRAIL CARS FOR GUADALAJARA. Height from track to underside of side sills, $27\frac{1}{8}$ in.; height from underside of side sills over roof, 9 ft. $1\frac{1}{2}$ in.; height from floor to center of headlining, 8 ft. $3\frac{1}{4}$ in.; track to step, $1\frac{1}{4}$ in.; step to platform, $13\frac{1}{2}$ in.; platform to floor, $8\frac{1}{8}$ in.; weight of carbody without electrical equipment, 13,000 lb.; weight of trucks, 6880 lb.; total weight, 19,880 lb.

garden. The city has a good water supply, derived from springs and brought in through an aqueduct 8 miles long.

Guadalajara is surrounded by a fertile agricultural district and is an important commercial town, but the city is chiefly distinguished as the center of the iron, steel and glass industries of Mexico. It also is widely known for the artistic pottery manufactured by the Indians of the city and of its suburb, San Pedro. Among other prominent industries are the manufactures of cotton and woolen goods, leather, furniture and hats.

which partially destroyed the two cathedral steeples, and that of March, 1875, which damaged a great number of the larger buildings. The population is perhaps typical of Mexican cities, including as it does large indian and mestizo elements.

In the underframe of the car side sills of $31\frac{1}{2}$ by 5 by $5/16$ in. angles are used, the cross members being 5 in., 9.75 lb. I-beams and 3 in. 4 lb. channels, and the end sills being of $31\frac{1}{2}$ by 5 by $5/16$ in. angle, the same as the side sills. The bolsters are nine inches in width, being flanked on either side



OPEN TRAIL CARS FOR GUADALAJARA. These cars were shipped from New York to Vera Cruz and thence by rail inland to Guadalajara. As a consequence of the recent disturbances in Mexico this shipment was delayed

by $2\frac{1}{2}$ by $2\frac{1}{2}$ by $\frac{1}{4}$ in. angles with $2\frac{1}{4}$ in. square fillers. The platform is built on $2\frac{1}{2}$ by $2\frac{1}{2}$ by $\frac{3}{8}$ in. angle outside knees, two on each side of the car spaced vertically by $\frac{3}{8}$ by 8 in. plates and on $3\frac{1}{2}$ by 5 by $\frac{5}{16}$ in. angle center knees. The bumpers are of $3\frac{1}{2}$ by 6 by $\frac{3}{8}$ in. angle. Diagonal braces of 3 by $\frac{3}{8}$ in. steel are also used, tied to the outside platform knees and to the end sills, being crossed at a point about 20 in. in front of the end sills.

In the body framing of the car $2\frac{1}{2}$ by $2\frac{1}{2}$ by $\frac{5}{16}$ in. tees are used as posts, spaced 4 ft. 11 in. apart. This is due to the fact that

the car is open and also to the location of the seats. These are placed back to back, making the wide interval between side posts necessary because of the space that must be left between the seats for knee room. Although the cars are designed for entrance and exit at the front or rear instead of from a running board (the aisle providing access to the seats) by placing the side posts this far apart the car, if desired, might be equipped so as to provide for entrance and exit at each seat, simply by the removal of the safety screening along the sides of the car and the application of running boards.

Just why flanges are put on the inside of wheels is apparent when the construction of a curved track is considered. In taking a curve, where the outer rail is of course banked, the weight comes heavily upon the outer wheels and the tendency is for the car to take the curve on two wheels (the outer two). Thus it may be seen that, were the flange not on the inside of the rail, there might be a tendency for the car to leave the track.

ALL-STEEL BAGGAGE CARS FOR PORTSMOUTH, OHIO

BRILL 27-M.C.B. TRUCKS

TWO 50-ft. steel-frame baggage cars, mounted on Brill 27 M.C.B. Trucks, have been completed by the G. C. Kuhlman Car Company for the Portsmouth Street Railroad & Light Company. These cars are part of an order which included also the four 54-ft. steel-frame combination smoker, baggage and passenger cars described in an article published in the May issue of BRILL MAGAZINE. Details of the operation of the

company's lines are included in that article.

The two baggage cars are arranged for double-end operation and are almost entirely of steel, the underframe, sides, and side, corner and vestibule posts being of that material, while the floor and vestibule sashes are of wood. In the main the underframes of these cars are the same as those upon which the four passenger cars were built, except that heavier



BAGGAGE CARS FOR PORTSMOUTH, OHIO. These cars are part of an order which included also four combination smoker, baggage and passenger cars. These latter cars were described in BRILL MAGAZINE for May



BAGGAGE CARS FOR PORTSMOUTH, OHIO. Length over all, 50 ft.; length of carbody over vestibule sheathing, 48 ft.; width over all, 8 ft. 6 $\frac{3}{4}$ in.; height from rail over trolley plank, 12 ft. 2 $\frac{1}{8}$ in.; weight of carbody less electrical equipment, 23,916 lb.; weight of electrical equipment, 1246 lb.; weight of airbrake equipment, 1598 lb.; weight of trucks, 18,820 lb.; weight of motors, 10,720 lb.; total weight, 56,300 lb.

members were used, where necessary, to take care of the heavier load. The cars are designed to carry a maximum load of fifteen tons.

The cars are provided with four steel doors, two 6-ft. sliding doors being placed one in the center of each side of the car and a 28-in. swinging door being located at the diagonally opposite corners of the car, on the right of the motorman. In back of each motorman there is provided an iron-pipe protection from falling parcels or baggage. The center sliding doors, when

open, are protected by a guard or pocket into which the door slides. Inside, the car is lined with sheet steel, the outside sheathing also being of steel.

The roof of the car is of the Brill Plain Arch type, supported on steel carlines and covered with tongued and grooved poplar roof boards, over which is laid cotton duck in one piece over the roof and hood. This duck is laid in white lead before the lead is dry. Brill "Dedenda" gongs and Brill patented signal bells are part of the equipment of the cars.

To take care of the strain placed upon the roof of a car by the extra weight of the trolley base and pole and by the leverage the center of the roof is made $\frac{3}{8}$ in. higher than the rest of the roof and sloped off gradually to the ends, the sides of the car being brought in the same distance at the center. In cars where continuous rafters are used this is not necessary. It is the joint of the carline with the top rail that offers a point for possible failure in the other construction.

BAGGAGE AND EXPRESS CAR FOR BUFFALO, LOCKPORT & ROCHESTER

ALL-STEEL CONSTRUCTION

THE Buffalo, Lockport & Rochester Railway Company, of Rochester, N. Y., has received from The J. G. Brill Company a 50-ft. baggage and express motor car for use in handling its baggage and freight service. The operation

ling of this service that the new car was purchased. The car is very similar to the type built for the Grand Rapids, Holland & Chicago Railway, which was described in BRILL MAGAZINE for February, 1915, and it is also similar to the



BAGGAGE AND EXPRESS CAR FOR BUFFALO, LOCKPORT & ROCHESTER. This car is to supplement the equipment at present in use by the company in taking care of its extensive express and baggage service. A detailed description of the operation of the road may be found in the leading article of this issue of BRILL MAGAZINE

of this company is fully described in the leading article in this issue of BRILL MAGAZINE on the subject of "Interurban Centers and Interurban Cars—Rochester." Also, additional views of the line, with a detailed description of its operation, were incorporated in the issue of BRILL MAGAZINE for November, 1915, the subject of whose leading article was "Interurban Centers and Interurban Cars—Buffalo." Freight and express form an important part of the company's operation, and it was to supplement its present equipment in the hand-

type of car built for the Toledo & Western Railroad Company, which car was completed toward the latter part of 1915.

The car is built on a steel under-frame in which the side sills are angles whose longest leg measures 7 in. The intermediate sills are 7-in. channels and the center sills 7-in. I-beams. The body bolsters are of the built-up type, with 10 by 1-in. top and bottom plates and they are riveted to the lower flanges of all the longitudinals. The side sills are reinforced with 3 by 3 by 1½-in. angles. Needle beams of



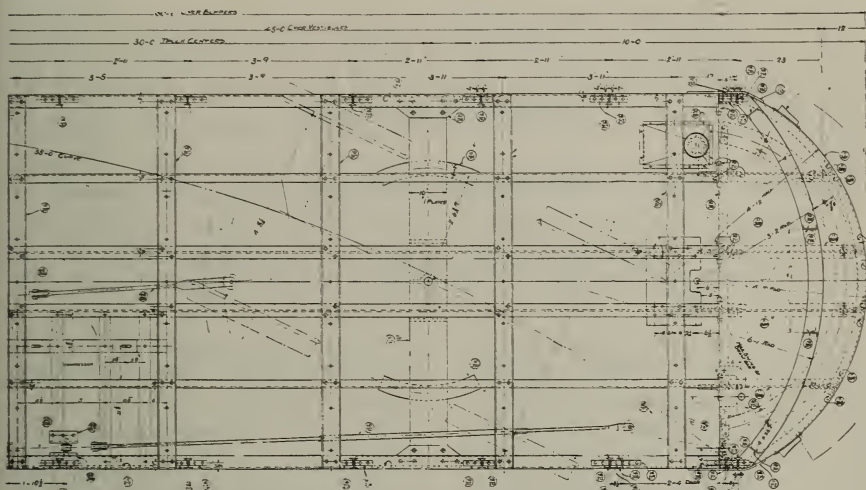
BAGGAGE AND EXPRESS CAR FOR BUFFALO, LOCKPORT & ROCHESTER. The pipe stanchions, which are located just back of the motorman's position at each end of the car, are shown in the illustration. They are to protect the motorman against piled-up baggage, boxes, bundles, etc.

8-in. I-beam section are also used, spaced equi-distant from the center of the car.

One of the features of the construction of the car is the making of the side posts and roof carlines in one continuous piece, 3-in. I-beam section, extending from side sill to side sill. The outside sheathing, which is of 3/32-in. sheet steel, is put on in plates extending from the bottom of the side sills to the top of the letter panels and wide enough to lap over each other on the side posts. At the center of each side of the car there is a 6-ft. sliding solid steel door, the door openings framed with 4-in. channel.

At the motorman's right hand side of the car, at each end and next to the corner post, there is a 28-in. hinged door of steel, the upper portion glazed. Also, in the center of the vestibule, there is a similar door, this latter door provided with drop sash which is glazed.

Placed transversely of the car and on a line drawn across the car from the first side post there are five 2-in. iron pipe stanchions extending from the floor to the roof of the car. These stanchions, placed at the diagonal corners of the car, are directly behind the motorman's position and thus boxes and bundles or pieces of baggage



BAGGAGE AND EXPRESS CAR FOR BUFFALO, LOCKPORT & ROCHESTER. Length of body over corner posts, 44 ft. 2 in.; length over platforms, 50 ft.; length of baggage compartment, 38 ft. 4 in.; centers of side posts, 2 ft. 11 in.; width over sills, including sheathing, 8 ft. 6 in.; height from track to underside of side sills, 3 ft. 6½ in.; height from underside of side sills over trolley boards, 9 ft. 9½ in.; weight of carbody without electrical equipment, air-brake and trucks, 26,230 lb.

may be piled to the roof without interfering with the safe operation of the car.

There are four windows in each side of the car, these windows being of the stationary type and located two on each side of the center door. This gives the car plenty of light, these windows being supplemented by the windows in the motorman's doors and by the vestibule windows. These side windows are protected with iron

window guards to prevent breakage from freight or baggage falling or being thrown against the glass. Thus it may be seen that the interior of the car is designed so as to make the handling of freight and baggage easy, plenty of light being provided and an easy method of piling baggage, etc., being arranged.

Brill specialties supplied with the car include Dedenda Gongs, and Brill Patented Signal Bells.

One of the hardest problems of steel car construction is the side sheathing. It is difficult to obtain sheet metal which is entirely free of buckles and as a consequence after the sheathing is applied there must be done quite a little work in the way of straightening up the sheets. Expert sheet workers take the buckles out of the sheathing after it has been riveted. The process is a combination of heating at the proper places and then allowing to cool in varying degrees.

EXPRESS CARS FOR ALBANY SOUTHERN

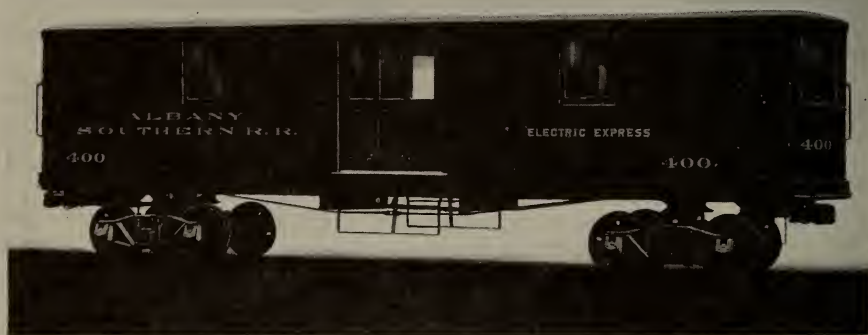
STEEL UNDERFRAMES

TWO 40-ft. express cars for use on the lines of the Albany Southern Railroad Company have been completed by the Wason Manufacturing Company, of Springfield, Mass. These cars are to be used as trailers in the express service which has been built up by the company over a considerable period, and they probably will be used in trains with the all-steel motor express cars built for the company in 1915 and described in BRILL MAGAZINE for January, 1915. The Albany Southern operates a third-rail double-track system on the east side of the Hudson River, plying from Albany through a fertile and populous farming district to Hudson, a distance of about thirty miles, and forming a means of communication between a number of the more important small cities and towns of the region. The

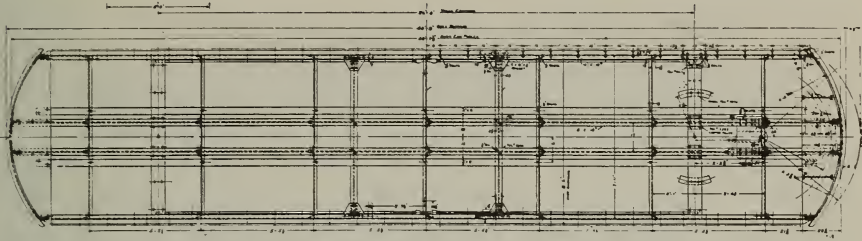
express business, which forms an exceedingly important feature of the business of the company, consists of the transportation of express between Albany and the points served by the company or to Hudson, where transfer is made to New York by way of the New York Central Railroad.

The cars are erected on steel underframes, in which the side sills are of 10-in. channel and the center sills and needle beams are each 8-in. I-beams. The crossings are of 5-in. channel. A sub side sill of 6 by 3½ in. southern pine is also used. The bolsters are of the truss type, of wrought iron and steel plates, the top member, 8 by 1 in. and the bottom member, 8 by 1⅞ in., iron filler blocks being used to truss the members.

The baggage doors, 5 ft. in width, are located on either side of the



EXPRESS TRAILERS FOR ALBANY SOUTHERN. These cars are to be used for trailer work in handling the express business, which forms a very considerable part of the company's business



EXPRESS TRAILERS FOR ALBANY SOUTHERN. Length of body over corner posts, 32 ft. 7 in.; length over platforms, 40 ft. 1½ in.; centers of side posts, 29 ft. 1½ in.; width over sills, including sheathing, 8 ft. 6 in.; height from track to underside of side sills, 3 ft. 5 in.; height from underside of side sills over roof boards, 8 ft. 6¼ in.; weight of carbody, less electrical equipment, 17,500 lb.; weight of trucks (2) 11,500 lb.; total weight, 29,000 lb.

car. The upper parts of these doors have three lights of glass, and these, with the windows provided in each side of the car, furnish light enough for the interior. There are two doors in each vestibule (the vestibules are partitioned off from the interior of the car with bulkheads, in each of which there is a sliding door), the doors at the left-hand diagonal corners being wider than the others. All four of the doors have one light of glass in the upper part, and they

are all arranged to swing inward.

Outside the cars are sheathed in ¾ by 3½ in. tongued and grooved yellow pine. At each side door-post this sheathing is protected by a plate 30 in. long, set vertically, and a 24 by 36 in. plate, ¼ in. thick, is used on each side of the baggage door opening. The roof of the car is of the arch type, ash and steel carlines forming the support. The corner, door, side and bolster side posts, as well as the panel rails, side and end plates are of wood.

The arrangement of doors on street cars is worthy of more than a passing consideration. In some cases doors are swung out and in other cases they are swung into the platform. The direction of the swing is determined by the design of the car, whether the door is for entrance or exit. If for exit the doors swing out and if for entrance they swing in, thus swinging with the passenger in each case. However, in many cases there is no room on the platform, because of brake apparatus, controller, etc., for an inward-swinging door and so Brill practice has been to make all doors swing out unless different arrangement is required. The popular tendency is to build a double door in four leaves, two opening against the corner post and the other two swinging against the vestibule post.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

AMUSEMENT PARK ADVERTISEMENTS

A HAPPY combination of peaceful quiet with sound, healthful amusement—that is — Park.

Dance, row, paddle, chase any of the merriment-producing features, or just sit quietly in the cool retreats of — Park if you're in search of a pleasant evening.

Children could be nowhere safer than at — Park. The chief desire of every one connected with the park is for the kiddies to have a good, free-from-danger time.

It takes the heat out of these stifling nights, does a ride to — Park.

Every amusement safe and clean and the whole place full of pure, fresh, cool air—that's — Park.

Dancing is recognized as a most healthful exercise. At — Park it is the king of amusements. The dance floor is well regulated and there is not a single objectionable feature.

Modern dances have become so popular because they are such good exercise and because everybody can do them. The floor at — Park is enthused over every evening by a great host of young men and women.

“Clean as the air you breathe.” The air at — Park is far cleaner than the air you breathe all day—and ever so much cooler. Come out and fill your lungs.

HOW DO YOU SIZE YOURSELF UP?

THE man who underrates himself, even though it be only to himself, makes a very grave mistake. His habit is almost akin to laziness; the man is not willing to go to the trouble of living up to a high rating and therefore he underrates himself. In the same connection, there is nothing so true as that the world is apt to accept a man's apparent estimate of himself as the real one. Therefore, why should a man lower his standard in the eyes of the world?

PHYSICAL EXAMINATION FOR EMPLOYEES

(The following is from an address delivered before the Pennsylvania Street Railway Association by Dr. Francis D. Patterson, Chief of the Division of Industrial Hygiene and Engineering, Department of Labor and Industry of Pennsylvania, and physician in charge of the dispensary of The J. G. Brill Company.)

THE employment of any man in the operating department of a railroad without submitting him to a physical examination by a physician prior to his employment and the failure to re-examine him at frequent intervals means courting a disaster which may be titanic in size, if not in name. Raw material and finished product, such as coal, rails, cars, etc., are carefully tested by the company for any possible defect, and if this is so, then what possible reason can there be for not testing the most valuable of all raw material—human labor?

It has been calculated from reliable statistics that every wage earner in this country loses at least eight or nine days each year by reason of illness. If we stop to consider the millions of workers in America, the sum of the total loss in wages amounts to more than three hundred sixty millions of dollars each year, and this takes no account of losses in profits to the employer by reason of a slowing-up in his output nor of the loss to the State at large due to a premature old age, the result of disease.

The competent physician is a real dividend-maker in every corporation. If he is to assume the place in the industrial life of this country for which his training fits him, he should be the guide, philosopher and friend of employe and employer, maintaining a health supervision over the industry and its employes which will increase both efficiency and profits.

The important things connected with a traction company that should be superintended by a physician are the lighting, to see that proper lighting is provided as a means of increasing efficiency and preventing accidents to the employes, to the passengers and to the public at large. He should see to it that cleaning is efficiently, cheaply and healthfully performed by vacuum cleaning or by other dustless methods. Then he should look after the matter of rest rooms, with sanitary toilet facilities, individual wash basins and shower baths and cooled pure water, all of which increase efficiency and decrease accidents. Then there are the subjects of the relation of fatigue to efficiency, excessive working hours and the providing of proper facilities for the right kind of rest, all of which subjects should be supervised by the physician.

The physician in connection with the traction company may be of value in suggesting improvements, which, though entailing little or no outlay on the part of the company, may bring in large returns in the shape of increased efficiency of the company's men. Among these things, for instance, is the use by motormen of protective glasses with lenses of Crooks or Feusal glass to obviate the intensely harmful infra-red and

ultra-violet rays from either the sun or the present high candlepower gas or electric automobile headlight. The physician should do all first-aid work, or as much of it as practicable, and redress all injuries, thereby insuring safety against infection and serious complications. He should examine all applicants for employment, re-examine all employes at a yearly interval and again make an examination before the employe resumes work after an absence due either to illness or injury. The physical examination of applicants for employment and their re-examination at stated intervals and after disabling accidents or sickness bears a very important relation to the accident problem of the American railroads, which problem frequently results in a needless sacrifice of life and limb.

One of the best features of the project of examining prospective employes is that no company need hesitate over the expense, for the medical department may be made self-supporting by charging the applicant a fee for examination. The average man will be more than willing to pay such a fee because of the many advantages accruing to him. Among these are: He is assured of having a healthy fellow-employe and therefore he is insured against being exposed to communicable diseases: any disease is detected in its incipency and prevented by prompt treatment; he is insured the prompt correction of any physical faults discovered, and assured being placed in work for which he is fit physically.

FOR THE SHOPMAN

THE man in the shop may better his position a great deal more quickly than he thinks, simply by paying more attention to small details, things that perhaps he has considered beneath his notice. The workman who catches an error in the job upon which he is working and who corrects that discrepancy rather than to allow it to be corrected by the boss or the inspector obviates the necessity of a second handling of the work and a very appreciable loss of time and money. It is the chap who works with his brain as well as his hands that gets along, and it is the fellow who pays minute attention to details that scores a hit with the boss.

CHANGES OF ADDRESS

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



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THE BRILL 76-E TRUCK

THE superior strength and riding qualities of the Brill 76-E Truck—features which have won for the truck a deservedly wide popularity—are the results of the combination of solid-forged side frames, angle end frames, deep angle transoms fastened to the side frames with single- and double-corner brackets and fold-over gusset plates, one-piece cast-steel bolster, oil-retaining center plates, “Half-ball” Brake Hangers and graduated spring system for light and heavy loads. The Brill Graduated Spring System is standard on all Brill short-base, pivotal, single- and double-motor trucks. By means of this system the bolster spiral springs automatically are put into action when the car is carrying less than the load for which the springs are graduated. Any addition to the load beyond this point brings the other springs into action. This system is perfectly adapted to service conditions and a decided improvement in truck construction which master mechanics have been quick to recognize.

THE J. G. BRILL COMPANY, PHILADELPHIA

BRILL MAGAZINE



Fourteenth St. & Broadway,
Oakland Cal.



BRILL "WINNER" SEATS

THE extremely light weight of the Brill "Winner" Seat is one of its most appealing points. This light weight is made possible by the double levers at each end of the seat, which perfectly equalize the action in reversing the seat and which provide a large degree of stability without making the seat heavy. When the back of the seat is in its normal position the shaft crank engages with the seat lock and holds the cushion firmly in position. The cushion easily may be removed for cleaning by swinging the back over to center. The seat may be had in any style of upholstery or in wood.



Heavies

PRESIDENT, TOLEDO RAILWAYS & LIGHT CO.

Something is happening in the public utility business—likewise it is happening for the good of the business. I mean by this that the public is putting on a more friendly attitude towards the street railway, the electric company and other interests that serve the public. We notice it in Toledo and presume that other cities are feeling the closer cooperative spirit between the public and the public service corporation.

Education, I believe, is chiefly responsible. The mere fact that you are continually advocating the safety of the car riders and the employes of the company seems to make the people in your city feel that there is something humane about the corporation.

The improvement of equipment is another element that brings the people and the company into a more cordial relationship. Better cars, cleaner cars, improved lighting for cars, the courteous way of handling the public, which is becoming more noticeable and more pronounced among the present-day platform men, is rapidly swinging the public sentiment toward the street car company.

In Toledo we hear less about the desire of the people to own the property. Perhaps it is the war, perhaps it is the stringent financial conditions of Ohio cities due to lower taxation, perhaps it is the public's realization that there is a desire to serve instead of a desire to save on the part of the company, but at any rate there is a noticeable decrease in the clamour for municipal ownership which prevailed in many cities of this section a few years ago.

We all know that a good street car system builds a city more than any other agency. The extension of a line means the opening of a new real estate addition, new homes, new residents in a city. We know this and all that remains is to make the public believe it through an earnest effort to get closer to the people through satisfactory service.

FRANK R. COATES.

JULY 15, 1916

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FRANK R. COATES

FRANK R. COATES was born in Philadelphia, June 20, 1869. He was educated in the public and high schools of that city and was graduated from Lehigh University in 1890 and took a post-graduate course in 1891, receiving the degree of Engineer of Mines. In 1891 he went with the Baltimore & Ohio Railroad and the next year was made Supervisor of the Wheeling Division of the road. In May, 1893, he was made Assistant Roadmaster of the New York Division of the New York, New Haven & Hartford and in December, 1895, was made Roadmaster of that division, in charge of maintenance and the four-track construction. In October, 1900, he became Chief Engineer of the Chicago Great Western road with headquarters in St. Paul. In 1904 he entered the engineering and construction business in the building of bridges, electric railways and hydro-electric plants, remaining in the same until December, 1909, devoting the last two years of this period to the business of the Stone & Webster corporation, with headquarters at Boston, Mass. On December 1, 1909, he became Vice-President of the Inter-Ocean Steel Co., of Chicago, and remained there until 1911, when he became President of the Toledo Railways & Light Co. and subsidiary companies, which include the Toledo & Western Ry., Maumee Valley Railway & Light Co., Toledo, Ottawa Beach & Northern Ry., Toledo Beach Co., Adrian Street Railway, Toledo Casino Co. and Ottawa Park Railway. He is a member of the Toledo Commerce Club, Toledo Club, Toledo Rotary Club, Country Club, Inverness Club, Transportation Club, Automobile Club, Toledo Maennerchor, Maumee River Yacht Club, Toledo Yacht Club, New York Railroad Club, Western Railway Club, American Society of Civil Engineers, National Geographic Society, American Railway Engineering Association, American Electric Railway Association, National Electric Light Association, Engineers Club of Chicago, Chicago Club, Chicago Athletic Association, Metropolitan Club of New York, Recess Club of New York and the Engineers Club of New York.

INTERURBAN CENTERS AND INTERURBAN CARS

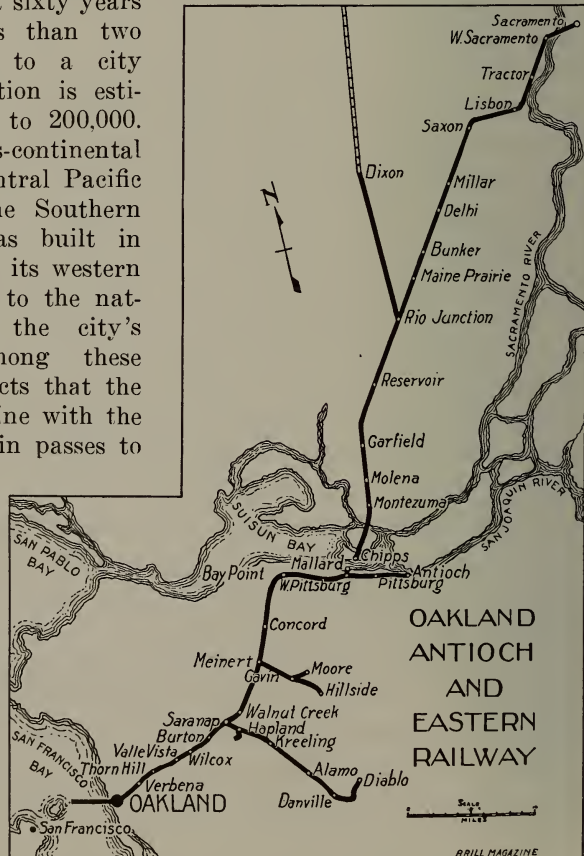
OAKLAND, CALIFORNIA



THE city of Oakland geographically is most unusual and extremely interesting, and its situation is responsible in a very large degree for the remarkable strides which have brought Oakland up within the last sixty years from a town of less than two thousand inhabitants to a city whose present population is estimated as being close to 200,000. The original trans-continental railroad (then the Central Pacific Railroad, but now the Southern Pacific Company) was built in 1869, with Oakland as its western terminus, due largely to the natural advantages of the city's location. Chief among these advantages are the facts that the city lies almost on a line with the easiest central mountain passes to the East and that it is on the mainland side of San Francisco Bay, directly opposite the city of San Francisco, making it necessary, therefore, to transship at Oakland all goods billed to San Francisco.

San Francisco Bay is the only natural harbor between

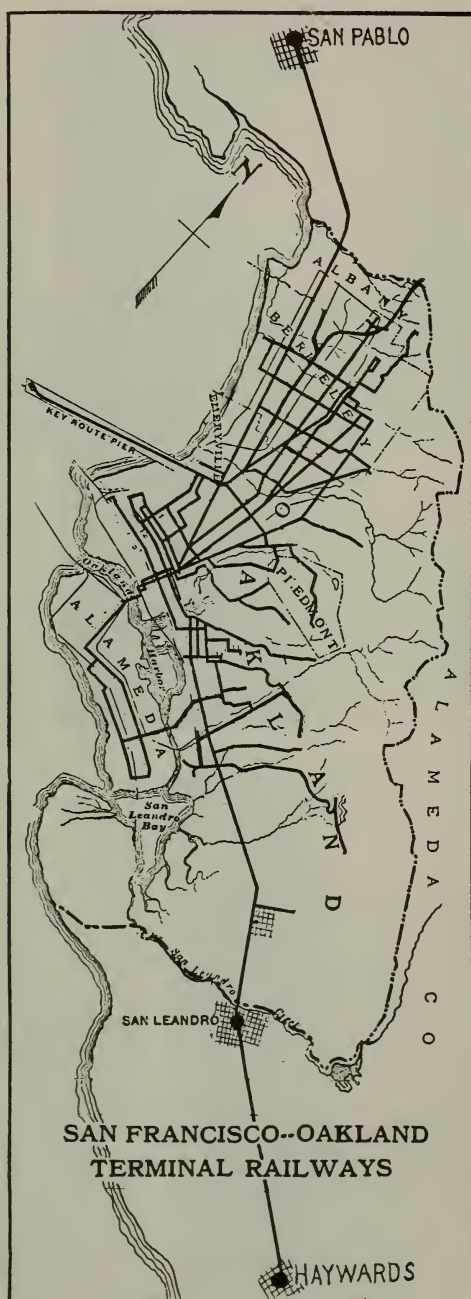
Puget Sound and San Diego Bay, and Oakland's location as the chief city of its mainland shore has helped a great deal in the city's progress, making it the natural selection as a railroad terminus. Hence, the city has excellent rail connections with all parts of the United States, Canada and Mexico by way of the Southern Pacific, the Western Pacific and the Atchi-

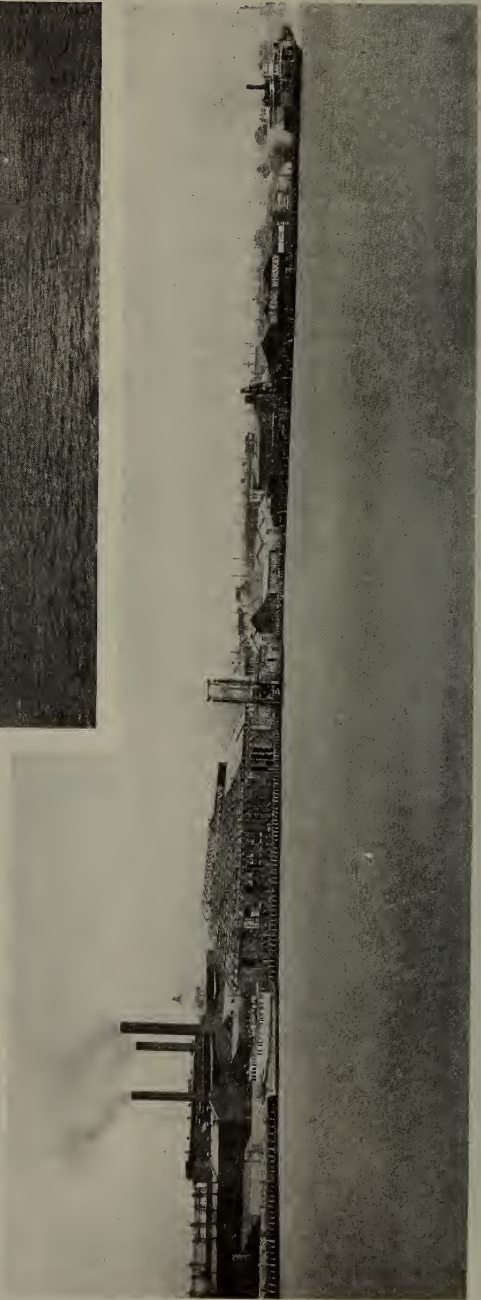


son, Topeka & Santa Fe Railways.

Oakland is the largest of a group of cities comprising also Berkeley, Albany and Alameda, the relative location of which may be seen from the map on page 195. These cities, with the populations of several smaller communities of Contra Costa County, make an aggregate estimated population of about 365,000 and form practically one city. This population is served by the high-speed electric suburban service of the Southern Pacific, which runs to most of the nearby towns; by the Oakland, Antioch & Eastern, and by the San Francisco-Oakland Terminal Railways. It is estimated that about ten per cent. of the total population of the sister cities of the East Shore are trans-bay commuters of San Francisco. Service is furnished these commuters by a ferry system operated by the San Francisco-Oakland Terminal Railways, known as the Key System, and by the Southern Pacific Company, which latter also operates a line of ferry-boats between Alameda and San Francisco.

Alameda is on an island separated from the mainland by Oakland Harbor, a land-locked arm of the San Francisco Bay, and is connected with Oakland by bridges. The Key System operates





One of the company's ferryboats
SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS
East Bay ferry terminal and trestle
Portion of estuary or tidal canal water front—Oakland



INTERURBAN CENTERS AND CARS. Ferry building in San Francisco from which San Francisco-Oakland Terminal Railway boats operate to Oakland

two lines between Alameda and Oakland. However, the growth of the shipping that is done in Oakland Harbor forms a serious interference with the schedules of these lines, because of the necessity for the frequent opening of the drawbridges. At present this matter of drawbridge operation is being made the topic of considerable discussion in the two interested cities. A 30-foot channel, 500 feet wide, is maintained by the United States Government, and this, with other improvements which include new wharves and the provision for new industries along the waterfront, promise to promote Oakland and Alameda to important places among Pacific Coast ports.

The transit facilities of the East Bay cities date back to 1869, when there was put into service a horse-car line about four miles long and serving 35,000 inhabitants. This service was supplemented rapidly, until at the close of 1887 there were seven separate

horse or cable lines and one steam line in operation. In 1890 construction work was begun on the first electric street railway connecting the cities of Oakland and Berkeley, and at the close of 1890 the mileage of the urban lines was about 40, for a population of 76,000. The growth of electric street car transportation thereafter was very rapid, with the result that the year 1897 saw the last of the horse, cable and steam lines built over for operation by electricity. In 1897 the various independent lines were consolidated into one organization, with a total of 94 miles of track for a population of 108,000. In 1902, application was made with the city of Berkeley, which is the seat of the University of California, for a franchise for the construction of an electric railway line suitable for heavy train operation, to be run in connection with a line of ferry-boats to San Francisco. Later, similar applications were filed with the cities of Oakland and Emeryville,



INTERURBAN CENTERS AND CARS. Ten-car train—Key System, San Francisco-Oakland Terminal Railways

and thus the Key System had its beginning. The most direct available route was selected, with its Berkeley terminus located so that it was 9.7 miles distant from the ferry building in San Francisco. One of the most interesting features of this road was the extraordinary length of the trestle, extending from the shore to the ferry slip on the Oakland side of the bay, the trestle being 3.26 miles long. This trestle was the

longest of its kind in the world, crossing salt water, and by its length it brought San Francisco nearer to the rail terminus of the East Bay cities than did any other line on the San Francisco Bay, thus giving the Key System a great advantage in being able to cut down the length of the ferry trip and consequently the total

time consumed, the ferry distance being but 2.85 miles, as against 6.11 miles from shore to shore. The first line was opened for service in 1903, with an hourly schedule, and within a month this schedule had to be revised so as to provide for a total of 97 trains daily, running on a 20-minute service. Within eight years additional lines were constructed, until the Key Route had a line of 46.12 miles of track, the urban lines'

total trackage being 216.27. At the present time more than 800 train movements per day are made on the branches of the Key System. In 1912 the so-called Key Route and all the urban electric lines in the East Bay Cities, with the exception of the lines of the Southern Pacific, were consolidated into one



INTERURBAN CENTERS AND CARS. Standard locomotive in use on Key System



INTERURBAN CENTERS AND CARS. Oakland, Antioch & Eastern all-steel train, drawn by fast passenger locomotive

organization—the San Francisco-Oakland Terminal Railways. The grand total of trackage, 262.39, requires a total of 401 passenger cars and 74 service or work cars. For the year ending April 30, 1916, the total of revenue passengers carried was 72,846,129, with a total of 16,629,679 car miles and a total of 15,882,158 passengers carried across the bay. The company is extending its lines continually, one extension being in progress and another being planned to be built within the next year.

In June, 1913, the company began the construction of the solid fill in San Francisco Bay, to replace a portion of its trestle. This work required almost three years, and in May of this year the old trestle was aban-

doned. The solid fill consists of two parallel rock walls 15,633 feet in length, leaving 3,747 feet of trestle still in use. Trenches were dredged along the bottom of the bay to give a solid foundation to the walls, which required about 626,000 tons of rock. To make this fill, 2,500,000 cubic yards were dredged from the bay and deposited between the rock walls, the width at the top being 200 feet. On top of this fill was



INTERURBAN CENTERS AND CARS. Standard passenger motor car of Oakland, Antioch & Eastern Railway



INTERURBAN CENTERS AND CARS. "M" street bridge over Sacramento River, over which Oakland, Antioch & Eastern operates

placed a heavier layer of base rock and ballast for the tracks. The entire length of this approach to the ferry slip is protected by automatic block signals spaced from 300 to 450 feet apart, and in addition automatic stop signals are used. The approximate

cost of the fill and improvements was \$1,250,000.

An article dealing with the conditions which govern the type of car for city service in Oakland was published in BRILL MAGAZINE for May, 1913. This article gives more in detail the handling of the

city traffic and the various types of cars in use on the lines. At present the company has an order with the American Car Company, of St. Louis, for twenty steel center-entrance double-truck motor carbodies mounted on Brill 77-E Trucks. These cars will be described in a future issue of BRILL MAGAZINE.

The Oakland, Antioch & Eastern Railway serves a territory whose population aggregates close to a million inhabitants, without taking into consideration the population of the rural districts



INTERURBAN CENTERS AND CARS. Oakland City Hall

through which the lines of the company pass. In addition, the population of the Northern Electric Railway cities which the trains of the company serve, total about 45,000. This Northern Electric territory is served by four trains a day between San Francisco and the Northern Electric Railway. The Oakland, Antioch & Eastern carries the coaches from San Francisco to Sacramento, where

the last coach is picked up by the Northern Electric and carried through to Chico, making a total mileage on this run of 183.63 miles. This run is one of the longest through electric runs in the West. In addition to these four through trains to Northern Electric terminals without change of cars, the company has eight other trains that make direct connections.

The company includes the prop-



INTERURBAN CENTERS AND CARS. Eight-car train of Oakland, Antioch & Eastern loading at one of its local stops

erty of the Oakland & Antioch Railway, San Ramon Valley Railroad and the Sacramento Valley Electric Railway. The company makes connections with other lines as follows: At Sacramento, Northern Electric Railway, and through that line to the Western Pacific and the Southern Pacific and the Central California Traction Company; at Bay Point, Santa Fe Railway; at Los Juntas, Southern Pacific Company; at



INTERURBAN CENTERS AND CARS. Limited train, "The Comet," of Oakland, Antioch & Eastern crossing Suisun Bay on ferry "Ramon"



OAKLAND, ANTIOCH & EASTERN RAILWAY

Train coming out of 3500-ft. tunnel connecting Alameda and Contra Costa Counties
Typical roadbed in the Moraga Valley
Train in Redwood Canyon

Oakland, San Francisco-Oakland Terminal Railways, and through that line with the Southern Pacific Company, the Santa Fe and the Western Pacific Railway. Thus may be seen the extent of the system, and the amount of business accruing from these connections readily may be conceived.

The current used by the company is purchased from the Great Western Power Company, which delivers it at 11,000 volts A. C. The company has five sub-stations for transforming this into D. C. current at 1,200 volts. These sub-stations average from fifteen to twenty miles apart, being located at Eastport, Concord, Montezuma Slough, Dozier and Lisbon.

The standard motor car in use by the company measures 55 ft. 5 in. over the vestibule, the trail car being 56 ft. 11 in. They each measure 10 ft. $\frac{1}{2}$ in. over the side sheathing and have a seating capacity of 50 and 60 respectively. The total weight of the motor cars being 93,260 pounds and that of the trailers 61,100 pounds. Both types of cars are designed for double-end operation and are built



INTERURBAN CENTERS AND CARS. Typical substation of Oakland, Antioch & Eastern, located at Concord

on steel underframes. The cars are operated on the main line in trains of from two to eight cars, being run singly on the branch lines.

Freight plays an important part in the business of the company. carload shipments of grapes, hops, fish, almonds, walnuts and tree fruits being made to the Eastern markets and all trans-continental freight from the Eastern markets being run into the company's



INTERURBAN CENTERS AND CARS. Terminal of Oakland, Antioch & Eastern Railway



INTERURBAN CENTERS AND CARS. Typical station of Oakland, Antioch & Eastern, located at Concord

terminals, the company being a party to trans-continental freight rates. For the local markets, carloads of tree-fruits, wine grapes, sugar beets, cattle, wool, wheat, barley, hay, lumber, cement and miscellaneous merchandise are handled. The company also handles Wells-Fargo Express.

The schedules of the road call for a maximum speed of sixty-five miles per hour, the stops on limited trains numbering but three in eighty-five miles, on the Sacramento trains but one stop in four miles, and on local trains two stops per mile. The high-speed schedules are made possible by the fact that between terminals the

trains are operated over a private right-of-way.

The entire line of the company is marked not only for its progressiveness and modern methods, but for the beauty of the country through which it passes. Sac-

ramento, capital of the State and inland terminus of the line, is 93 miles from San Francisco. Its early historical associations, its present beautiful surroundings and its position as the commercial center of the Sacramento Valley, make it one of the most important inland cities of the State. The operation of the line speaks highly for the development that has been made in electric railway operation. During the month of March, 1,782 trains were operated over a total of 156,329 car miles without a single record of lost time. The whole system is fully blocked with the latest equipment, rendering it safe. One of the notable features

on the company's lines is Redwood Canyon, located six miles from the company's terminal in Oakland. This canyon is covered with redwoods, manzanita, chaparral, flowers and ferns and is extremely picturesque. Pinehurst Station, located in the canyon, is the resort of thousands of picnickers.



INTERURBAN CENTERS AND CARS. "The Comet", limited train of Oakland, Antioch & Eastern Railway, at Bunker Station

CONVERTIBLE CARS FOR BRISTOL & PLAINVILLE

BRILL "RADIAX" TRUCKS

THE Bristol and Plainville Tramway Company, of Bristol, Connecticut, is a line connecting Bristol, Plainville, Forestville and Ferryville, for which service it has a total of

the Bristol and Plainville operation Tenney and Company have under their management twenty other public utilities—for the most part lighting companies—which are located in New Jersey, New



CONVERTIBLE CARS FOR BRISTOL & PLAINVILLE. The light weight of these cars is one of their best features and is made possible through the proper selection of materials and the use of the "Radiax" Truck

thirteen miles of track and operates a total of about thirty motor cars. This equipment recently was supplemented by two 26 ft. 6 in. convertible cars, which were built by the Wason Manufacturing Company, of Springfield, Mass. The company, which furnishes lighting, power and steam and gas, is under the management of Charles H. Tenney and Company, managers and engineers of public utilities, of Boston. Beside

York, New Hampshire, Massachusetts and Vermont.

The cars purchased are remarkably light, when their seating capacity of forty persons is taken into consideration, the total weight of the car ready for service being but 26,300 pounds. This reduction in weight was greatly facilitated by building the cars on underframes of all-metal construction, sill plates and other items of construction being kept as light as

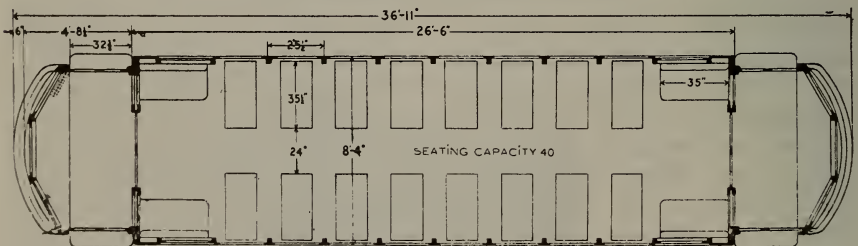
was possible. Also, the use of the "Radiax" Truck, permitting the car to be built 37 ft. over the bumpers, a greater length than would have been feasible with a rigid-axle truck and a length which otherwise would have necessitated the use of two trucks and consequently would have increased the weight very considerably, aided in keeping the car light and therefore in making its operation economical.

The vestibules are enclosed with two-leaf folding doors hinged to the vestibule corner post. In the vestibules, the center sash is arranged so as to drop and the two side sashes are built stationary. Inside the cars are finished in mahogany, including all doors, linings, mouldings, sash and side panels. At each end of the car there is a bulkhead, equipped with double-sliding doors with a 40-in. opening. The roof, which is of the Brill Plain Arch type, is equipped with six Brill "Exhaust" Ventilators, equipped with adjustable registers. This "Exhaust" Ventilator is proving itself one of the

most popular of Brill specialties. It keeps the air in constant circulation, removing the vitiated air and at the same time excluding rain or snow and, in winter time, preventing too sudden changes in the temperature of the car.

There are ten windows on each side of the car. The four corner windows (two placed on each side) are double—that is, the top sash is stationary and the bottom sash is arranged so as to raise. The eight intermediate windows on each side have removable panels which extend from the letterboard to the top of the side sills, these panels glazed with two lights of glass, which match the corner sash.

The seats selected by the railway company were the Brill "Winner" reversible all-steel seats, eight located on each side of the car. In addition to these cross seats there are four longitudinal seats, one at each corner of the car and extending the length of one window. These four longitudinal seats—having a capacity of eight persons—together with the cross seats, whose capacity is thirty-two,



CONVERTIBLE CARS FOR BRISTOL & PLAINVILLE. Height from track to underside of side sills, 2 ft. 5½ in.; height from underside of side sills over trolley boards, 8 ft. 6½ in.; height from floor to center of headlining, 7 ft. 8½ in.; track to step, 13½ in.; step to platform, 1½ in. platform to floor, 7¾ in. and 2-in. ramp; weight of carbody, including heaters, scrapers, auxiliary scrapers and fenders, 14,455 lb.; electrical equipment, 600 lb.; airbrake equipment, 745 lb.; trucks, 6600 lb.; motors, 3900 lb.; total weight, 26,300 lb.

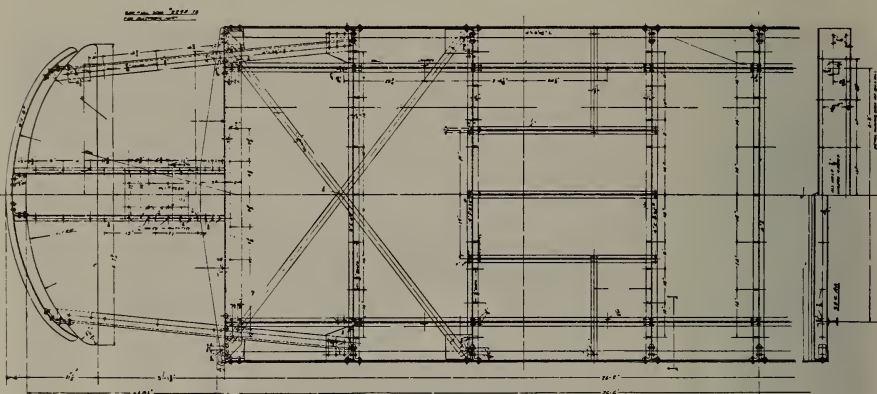


CONVERTIBLE CARS FOR BRISTOL & PLAINVILLE. The eight panels on each side of the car (the window at each corner is stationary) are arranged so that they may be removed and the car readily converted into an open car. These removable panels extend from the letterboard to the side sill

give the car a total capacity of forty persons. The selection of Brill "Winner" seats is another notable feature of the list of materials and specialties specified for these cars by the railway company. This seat, which is shown in the advertisement on the inside cover page, might be said to be comparatively new. It has been creating a great deal of favorable comment and the number of instances in which it is specified is a good indication of its growing popularity. It is remarkably light in weight and yet is very strong, which fact is demonstrated by the thoroughly satisfactory service it has given. Other Brill specialties include

"Dumpit" Sandboxes and "Dendenda" Gongs.

The "Radiax" Truck upon which the car is mounted is one of its most interesting features. This truck, following a lengthy series of experiments, was adopted a few years ago by The J. G. Brill Company as its standard radial-axle truck. The importance of the radial-axle truck lies in providing a means for operating single-truck cars of greater body lengths than could be carried on the rigid-axle truck, the average limit of which is 7 ft. 6 in. Its economic feature is therefore apparent, it being possible to carry cars on a single truck that ordinarily would require a



CONVERTIBLE CARS FOR BRISTOL & PLAINVILLE. The cars are built on all-steel underframes, which were designed with a view to keeping the weight down

heavier double-truck equipment.

The value of the "Radiax" in connection with this particular equipment thus readily may be seen. A single-truck car with an overall length of 36 feet and a seating capacity of 40 persons, such as are provided this car, would be an impossibility were it not for the radial-axle truck. The particular truck selected for this equipment has a wheelbase of 11 ft. 6 in. and is equipped with 30 in.

wheels, which gives the car a height of 2 ft. $5\frac{3}{8}$ in. from track to underside of side sills, a reasonably convenient height for loading and unloading passengers. The step heights are $13\frac{1}{2}$ in. and 12 in. and the height from platform to floor is $7\frac{3}{4}$ in. The "Radiax" is described in full in a bulletin, No. 219, just published. Full particulars concerning weights, dimensions, parts, etc., are incorporated in that bulletin.

It needs but a glance to prove that safety has become a primary object in modern car design. Many railway men can remember well the introduction of the fender as the first safety feature of street cars. However, to enumerate all the devices that have sprung up since the birth of the fender would be an almost endless task. The electric car has become almost "foolproof." Whether credit for this may be placed with the Safety First movement or whether the Safety First movement was a result of the progress being made by the many electric railways would be hard to say, but certain it is that every part of a car nowadays is constructed with a view toward the safety of those within and without.

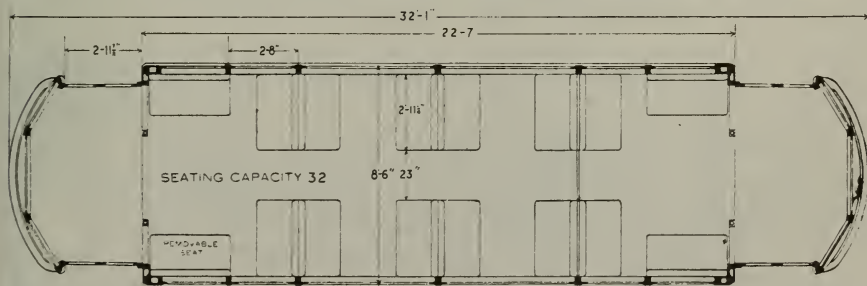


STORAGE BATTERY CAR FOR CHATTAHOOCHEE VALLEY RAILROAD

STEEL UNDERFRAME

THE Chattahoochee Valley Railroad Company, a steam road of West Point, Georgia, has purchased from The J. G. Brill Company, through the Railway Storage Battery Car Company, of New York, a 22-ft. combination passenger and smoking storage battery car. This

order is one of a number resulting from an extended effort on the part of the Railway Storage Battery Company to place their equipment with steam railroads, both short and trunk lines, it being the idea of the company that the field for the use of their cars is very much greater in suburban or inter-



STORAGE BATTERY CAR FOR CHATTAHOOCHEE VALLEY. Height from track to under side of side sills, 2 ft. 8 ⁷/₈ in.; height from underside of side sills over roof, 8 ft. 7 ³/₄ in.; height from floor to center of headlining, 7 ft. 9 ¹/₂ in.; track to step, 15 in.; platform to floor, 10 ³/₄ in.; weight of carbody without batteries and electrical equipment, 13,800 lb.; weight of electrical equipment, including batteries, 6400 lb.; weight of airbrake equipment, 800 lb.; weight of motors, 1700 lb.

urban service than for meeting the conditions of the more congested traffic of urban service.

The car is a typical combination passenger and smoking car, but it is to be used so that white and colored passengers are kept isolated. At each platform opening there is a double folding door and there is a partition door separating the white passengers from the colored. The windows, of which there are eight on each side of the car, are built with the top sash stationary and the lower sash designed to raise, the lower sash being fitted with ratchet sash lock and rack, so that it may be adjusted at any height.

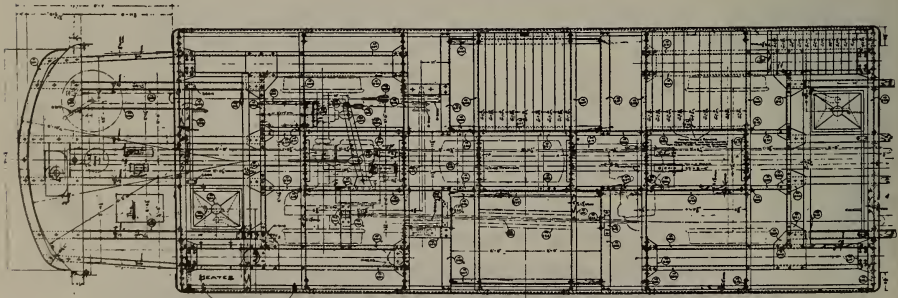
The platforms are enclosed with stationary round-end vestibules, sheathed on the outside with sheet steel. The step openings are enclosed with Brill folding doors and each vestibule is provided with three windows, each having a single sash arranged to drop.

In the underframe upon which the car is built side sills of $2\frac{1}{2}$ in. angle, end sills of 8 in. channel and stringers and crossings of 5 in. channel are used. The car is built

with a single floor of maple, provided with mat strips fastened to the floor in the aisle. In the body frame the corner posts are $3\frac{7}{8}$ in. thick, the side posts $2\frac{1}{4}$ in. thick and the posts are built with a sweep of $1\frac{7}{8}$ in. The body frame is built of ash and yellow pine throughout.

The roof is of the Brill Plain Arch type, running the full length of the car and strengthened with concealed rafters. The covering is of cotton duck, over poplar. Three Brill "Exhaust" Ventilators are used, placed down the center of the roof.

Brill Patented Angle Iron Buffers are used, supported on knees especially designed for the purpose. This buffer extends from side to side and projects beyond the crown rails, affording the car the maximum protection. Also, Brill Patented "Dumpit" Sandboxes, placed at diagonal corners and arranged so as to be operated by a foot lever, were specified by the company. Inside the car is finished in ash, stained cherry mahogany, including the doors, linings and mouldings.



STORAGE BATTERY CAR FOR CHATTAHOOCHEE VALLEY. The car is built on a steel underframe, the design of which was given careful attention, due to the unusual disposition of weight because of the 6400-lb. battery load



STORAGE BATTERY CAR FOR CHATTAHOOCHEE VALLEY. The car is to be operated in a territory where the isolation of colored from white passengers is required by law. The arrangement of its compartments is shown

The seats used in the car are Brill seats, upholstered in rattan and placed back to back, as shown in the cut of the floor plan of the car herewith. Each side of the car has two transverse seats with stationary backs, two transverse seats arranged back to back and two

longitudinal seats, taking care of four persons each, one of these seats to carry three passengers when the heater is in place. Thus the total seating capacity is 32. This capacity allows eight seats in the colored compartment in the summer and seven in the winter.

A single-truck car with a weight per seated passenger of but 333 pounds seems to be the lightest single-truck car on record. This is the one-man car built for Stone and Webster. Its description was given in Brill Magazine for April. For a double-truck car the Pittsburgh Railways car seems to underweigh the others on record. Its weight, fully equipped, is but 40,000 pounds, making its per-seated-passenger weight 579 pounds.



EQUIPMENT FOR ASHTABULA RAPID TRANSIT COMPANY

BRILL 39-E TRUCKS

FOR service in a city whose population is about 20,000, the Ashtabula Rapid Transit Company, of Ashtabula, Ohio, has selected as the proper type of car a 25 ft. 4 in. double-end vestibule motor car, built by the G. C. Kuhlman Car Company, of Cleveland, Ohio, and mounted on Brill 39-E Trucks. This car is very similar in general construction to the type of a previous order built for the company in 1913 and the fact that the design was ordered repeated in this new equipment bears evidence of the satisfactory service which has been obtained with the car.

The Ashtabula Rapid Transit Company operates about six miles of track with a total of fourteen motor and six other cars. It shares in the power plant of the Pennsylvania and Ohio Railway

Company, with which it is closely allied, the list of officers of the two companies being practically identical. The Pennsylvania and Ohio Railway, which connects Ashtabula, Conneaut, Kingsville and Jefferson, operating twenty-six miles of track, has under its control the Ashtabula and Lake Shore Railway, connecting Ashtabula Harbor and Woodland Beach Park. Thus, connection with these roads may be seen to be decidedly advantageous to the Ashtabula Rapid Transit Company.

The car built under the new order differs from the older equipment in that the bulkheads were eliminated, the longitudinal seats extending to the body corner posts and all vestibule platform doors were made of the sliding type exactly like the sliding exit doors that were provided with the former

order. The doors and steps operate in unison, the exit door, at the right of the motorman, being operated from the motorman's station and the entrance door, to the motorman's left, operated from the conductor's station at the end sill of the car. Thus, the car is operated under the P. A. Y. E. system.

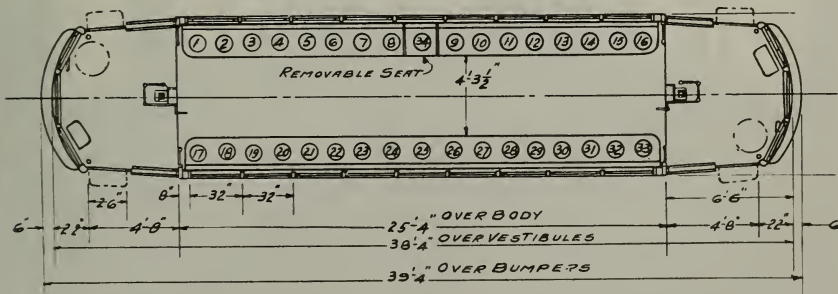
In the body framing of the car corner posts $3\frac{5}{8}$ in. thick and side posts $2\frac{1}{4}$ in. thick are used. There are nine windows in each side of the car, the window heads being arched and the top sash built stationary and the lower sash arranged to raise. The underframing of the car is of the composite type, one of its features being the use of the standard Kuhlman skeleton knee as the outside platform knee. This knee is built up of channel iron spaced by I-beam separators.

The roof is of the Brill Plain Arch type, with detachable hoods, both roof and hoods covered with cotton duck and strengthened by concealed steel carlines, one over each side post. Six Brill "Ex-

haust" Ventilators are installed, three down each side of the trolley board. Brill patented angle-iron bumpers, $3\frac{1}{2}$ by $\frac{3}{8}$ by 6 in. angle, are used. Also, Brill "Dedenda" Gongs were specified by the railway company.

In the vestibules the finish is sheet steel below the windows, with rails and mouldings and other finish of the "sanitary" type, in keeping with the finish on the interior of the carbody. This "sanitary" finish is observed throughout the construction of the car, all corners, mouldings and other projections which might catch the dust and dirt being eliminated. The vestibule sash is made double. The side sashes, both upper and lower, were built in solid and the center vestibule sash is arranged with the upper sash stationary and the lower sash arranged to drop into a pocket and provided with a rack to hold the sash at various heights.

There are provided two pipe stanchions on each platform, extending from the roof to the floor,



EQUIPMENT FOR ASHTABULA RAPID TRANSIT COMPANY. Seating capacity, 34; height from track to underside of side sills, 32 in.; clearance from track to bottom of bolster, 27 1/4 in.; weight of carbody without electrical equipment, 17,110 lb.; weight of electrical equipment, 1136 1/2 lb.; weight of airbrake equipment, 1105 1/2 lb.; weight of trucks, 9780 lb.; weight of motors, 5848 lb.; total weight, including heater at 350 lb., 34,980 lb.

these stanchions located next to the vestibule cornerpost at the edge of the crownpiece. Also, at each cornerpost of the carbody proper there is a pipe stanchion extending from the floor to the bulkheads.

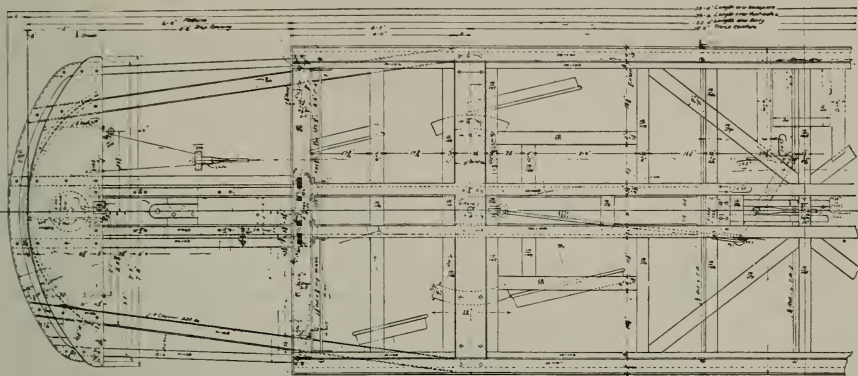
The seats are of the longitudinal type, the seats and backs of sheet steel on wooden frames, the steel covered with felt and canvas-lined rattan. Under these seats the space is left open, except at the diagonally opposite corners, where the sandbox is located. At this point the seats are panelled up around the sandboxes, the front of the panelling being provided

with a spring hinged door, arranged to open downward. At the center, on one side of the car, there is a section of the seat which is removable so as to provide for the installation of a heater, as desired.

The Brill 39-E Trucks, selected as the proper truck, is one of the outstanding features of this equipment. The truck is the Brill standard single-motor truck and is well adapted to all-around city service. It has the advantage of carrying the car low and, because the pivotal point is near the driving axle, it works in limited space, reducing the swing of the driving wheels and motion in rounding



EQUIPMENT FOR ASHTABULA RAPID TRANSIT COMPANY. The interior of the car is finished so that all mouldings, corners or projections which might form dust-pockets are eliminated. The vestibules are finished inside with sheet steel



EQUIPMENT FOR ASHTABULA RAPID TRANSIT COMPANY. The car is almost an exact duplicate of an order furnished the company about three years ago. That the car built under the previous order is rendering satisfactory service is shown by the fact that the design was ordered repeated

curves. The low pony-wheel end of the truck takes the larger part of the swing and the greater majority of the load therefore comes on the driving wheels, increasing adhesion so that the truck takes grades easily. Although most of the load comes on the driving wheels the pony wheels get a proper proportion to keep them safely on the rails.

Solid-forged side frames, made

only in the plant of The J. G. Brill Company, are one of the strong features of the truck, as are also the Brill "Half-ball" Brake Hangers, self-adjusting for wear and therefore noise-reducing. These Brill specialties are not exclusive features of the 39-E Truck, being used on all Brill Trucks. They have helped increase the popularity of Brill trucks to a highly satisfactory degree.

The necessity for building cut-offs, side-tracks, removal of sharp curves or steep grades probably in a great many cases is keeping electric railway companies from going into freight traffic as deeply as they should. The fact that one company, operating 460 miles of line, during 1915 handled approximately 25,000 carloads of freight, at an earning of \$500,000 in freight revenue, should, however, convince the average company that the freight end of the electric railway business is an immensely important one. Officials of the company whose figures are quoted say they have as yet "only begun to scratch the surface."

LIGHT EQUIPMENT FOR CENTRALIA TRACTION COMPANY

BRILL 21-E TRUCKS

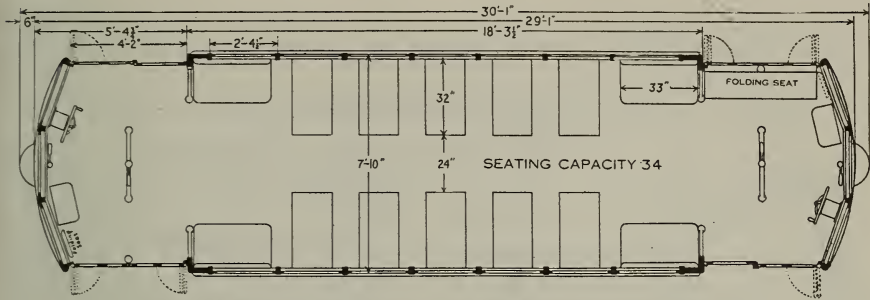
THE Centralia Traction Company, of Centralia, Illinois, has received from the American Car Company an order of two 18 ft. 3½ in. closed motor cars mounted on Brill 21-E Trucks. These cars are very similar to the three cars built for the Austin Street Railway Company, of Austin, Texas, and described in BRILL MAGAZINE for April, 1916. The cars are built on underframes whose design is identical and their weights tally throughout. However, there are differences in the construction of the interior, design of seats, etc.

The Centralia Traction Company is a suburban line extending from

Centralia to the village of Wamac and connecting with the Centralia & Central City Traction Company, a line connecting Centralia and Central City. The company operates about three miles of track, and with these two new cars has a total of seven cars. The cars are operated under the Pay-As-You-Enter method of fare collection, maintaining a schedule which provides for an average of twelve stops per mile. The line is so constructed that the densest traffic points are spaced about six blocks apart, thus allowing more than ample time between heavy collection points for the passengers to clear the platform and to find seats in the car.



LIGHT EQUIPMENT FOR CENTRALIA TRACTION. These cars are similar to the type of car built for the Austin Street Railway Company, Austin, Texas, which was described in BRILL MAGAZINE for April



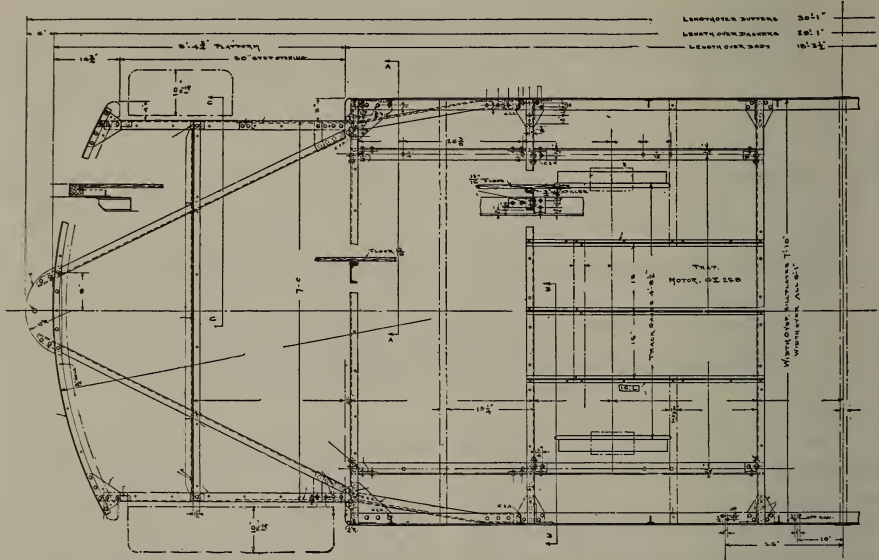
LIGHT EQUIPMENT FOR CENTRALIA TRACTION. Height from track to underside of side sills, 21 $\frac{1}{8}$ in.; height from underside of side sills over trolley boards, 8 ft. 5 $\frac{1}{2}$ in.; height from floor to center of headlining, 7 ft. 8 $\frac{1}{8}$ in.; track to step, 15 $\frac{3}{8}$ in.; step to platform, 12 $\frac{5}{8}$ in.; weight of carbody without electrical equipment, 8000 lb.; weight of truck, 4285 lb.; total weight, 12,285 lb.

The new equipment, which will serve as a supplement to the old equipment, is much more up-to-date, and it is anticipated by the officials of the company that it will

afford greater ease of operation of through traffic. The company purchases its power from the Centralia Gas & Electric Company. Its operation for the last year showed



LIGHT EQUIPMENT FOR CENTRALIA TRACTION. These cars are used as a supplement for the old equipment of the company. They are, however, much more modern in every detail



LIGHT EQUIPMENT FOR CENTRALIA TRACTION. The cars are mounted on Brill 2-E Trucks, and their total weight is extremely light

a total of 625,755 passengers carried, with a total car mileage of 181,318.3.

In the underframes upon which the cars are built side sills of 2½-in. angle irons are used, the cross sills being of 4-in. channel, fastened to the side sill angles and truck sills with gusset plates. The dasher angles are of 1½-in. steel fastened to the side sill angles with gusset plates. The diagonal platform sills are of 3-in. channel extending 6 in. beyond the dasher and having a 3/16-in. plate riveted top and bottom to form the draw-bar pocket. The platform knees are of 6-in. channel iron fastened to the side sill angles, cross sills and dasher angles.

In the body of the car corner posts of 1¼ by 1¼ by ⅛ in. angle iron are fastened to the wood corner posts, and the side posts are

of 1½ by 1½ by 3/16 in. tees, both corner and side posts extending continuously from sill to sill.

The cars are built for double-end operation, with straight sides and platforms on both ends on a line with the floor of the carbody. They have round vestibules, with drop sash and with folding doors on both sides of each platform. In the body of the car the windows are arranged with double sash, the top sash being built stationary and the bottom sash arranged to raise. Brill reversible cross seats, upholstered in rattan, are provided, and on the left side of each platform there is a folding seat, arranged so as to be thrown up against the front of the vestibule when not in use. These folding seats, each of which has a capacity of three persons, give the car a total seating capacity of 34 persons.

AUTOBUSES FOR CAMBRIDGE, MARYLAND

MOUNTED ON ONE-TON CHASSES

THE Cambridge Rapid Transit Company, of Cambridge, Maryland, recently received from The J. G. Brill Company two twelve-passenger, 12 ft. 5 in. auto-buses, which have been put into operation at Cambridge. This operation is close to that of the buses built recently for the Peninsula Rapid Transit Company, of Salisbury, Maryland, and described in BRILL MAGAZINE for March, 1916; both are on the lower part of the Delaware-Maryland Peninsula. The latter operation takes in Delmar (Delaware). Salisbury,

Fruitland and other neighboring Maryland towns, while the buses built for the Cambridge Company operate a little farther north, Cambridge being located on the Choptank River, one of the lower tributaries of the Chesapeake Bay, on the eastern shore.

The operations are alike in that each is very close to the Delaware boundary, the Salisbury operation, in fact, being right on the line between the two states. Thus they undoubtedly will create a demand for traffic facilities that will result before very long in the springing



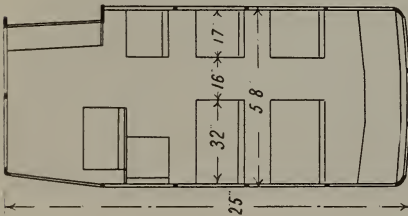
AUTOBUSES FOR CAMBRIDGE, MARYLAND. These buses are for an operation not so far distant from that of the Peninsula Rapid Transit Company, of Salisbury, Maryland. These bus lines give promise of building up a demand for traffic facilities throughout the eastern shore of Maryland and the lower part of Delaware that will mean much for the progress of the section



AUTOBUSES FOR CAMBRIDGE, MARYLAND. The design of this bus is an exceedingly popular one, the emergency rear door being an especially strong point in its favor

up of electric lines throughout the eastern shore of Maryland and the lower part of the state of Delaware. A line of the Delaware Division of the Philadelphia, Baltimore and Washington Railroad branches off at Seaford and, serving en route such towns as Federalsburg, Williamsburg, Hurlock and Airey, Maryland, terminates at

Cambridge. However, undoubtedly the rural districts about Cambridge, supplemented by those towns closest to Cambridge on the railroad, will furnish a present demand for transit that will be ample. The Maryland-Delaware Peninsula is rich agriculturally and is becoming more and more densely populated and more and more progressive. Many farms of extensive proportions are scattered throughout the peninsula and these are interspersed with rural villages and farms of smaller acreage, thus indicating the normal lines along which the growth is taking place. Hence, it is safe to assume that the location of these two bus lines is the forerunner of an expansion which will eventuate



AUTOBUSES FOR CAMBRIDGE, MARYLAND. Height from ground to first step, 16 in.; height from first to second step, 10 in.; height from second step to floor, 10 in.; height from floor over roof, 6 ft. 5 in.

in the establishment of more than one up-to-date traction system.

Entrance to the bus is effected by means of a 30-in. two-leaf folding door located at the front on the right-hand side of the bus, both upper and lower panels being glazed, the upper with clear glass and the lower with wire glass. These doors are operated simultaneously with the folding step, which is the lower of the two, the top step being stationary. At the rear of the bus there is an emergency door, access to which is possible through the design of the curved rear seat, which extends the full width of the bus and a section of which is arranged to lift up, uncovering the emergency door.

The upper sashes of the side windows (there are four on the right side and five on the left) are built in one continuous frame with the lower side sashes arranged to raise. The front end of the bus has two windows with the top sashes stationary and the lower sashes ar-

ranged to raise. A stationary storm shield is located over the left-hand front window.

The front corner and intermediate side posts are of ash, the rear corner post being of composite construction. The sheathing is metal secured to the corner and intermediate posts by strap irons. In the underframe the sills and crossings are of white oak, the sills $2\frac{1}{8}$ by 4 in. and the crossings $1\frac{3}{4}$ by $4\frac{1}{4}$ in. The roof is of the Plain Arch type with ash carlines, continuous from rail to rail. Inside, there is no ceiling, the rafters being left visible.

The seats are upholstered with canvas-lined rattan. There are three single stationary cross seats on the right-hand side of the bus and two double stationary cross seats on the left-hand side, a longitudinal seat for one person being located adjacent to the operator's seat. The complete body is mounted on a one-ton chassis with a wheel-base of 120 inches.

The prevalent use of bow contactors in Europe and the almost exclusive use of trolley collectors in this country furnishes food for thought as to the relative merits of the two. In favor of the bow contactor there is the constant contact with the current supply, the bow being unable to leave the wire, whereas the wheel may. On the other hand, the bow contactor weighs several times the poundage of the trolley collector and its use necessarily calls for consideration of the strengthening of the roof.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

A NEW SERVICE

ELECTRIC railway managers sometimes are faced with difficult problems connected with advertising their lines to the best advantage, and, for one reason or another, are not always able to obtain to aid them in solving these problems the right kind of advertising advice. The Publicity Department of The J. G. Brill Company, acting on an impulse which was born of several recent requests for help in advertising various railway projects, has decided to throw open to its friends—and under that category comes any company which sells transportation facilities, whether or not a customer of The Brill Company or its subsidiary plants—a service which is believed to be new. From now on The Brill Company not only will welcome, but earnestly solicits, requests from railway companies for aid in carrying on their local advertising. Communications containing information concerning the operation and the difficulties which are encountered will be carefully read, with a view toward the offering of suggestions as to the proper method of advertising, with the aim of obtaining better public co-operation, the abolition of handicapping regulations, the establishment of better traffic laws and any other object toward which the company may happen to be pointing. The services of the publicity staff of The J. G. Brill Company are thrown open to the electric railways of this and other companies, and the only recognition which ever will be asked for any service that may be rendered will be frequent usage of the service offered.

There probably might be found an infinitesimal number of ways of expressing the sentiment of this paragraph, but none of them will add anything to the thought, "Never make the same mistake twice." There is a value there—in that thought. It is the men who profit by their mistakes and learn how best to avoid a repetition of them who get along in this life.

The conductor sees a countless number of passengers do a countless number of foolish things during the course of his day's work. If he is not warped into a state of resentment at the apparent stupidity of the traveling public it is indeed a miracle. That feeling of resentment is perhaps the most natural in the world, but just the same it has to be overcome.

ALIGHTING ACCIDENTS THE MOST COSTLY

IT has been proved that the majority of accidents on street railways are alighting accidents, and it also has been found that these alighting accidents are the most costly variety. In almost every case these accidents are due to the carelessness of one of the members of the crew; in fact, they seldom occur as the result of any other thing. The company which hands you your pay envelope every week is held legally responsible for every one of these accidents, unless it can be shown without doubt that the greatest care was taken to prevent the accident. To prove this is next to impossible, because human nature is constructed so that sentiment is against the company and the eyes of witnesses always are found to have been wonderfully sharp just at the moment the accident happened. Someone is to blame for every accident. There are few circumstances under which alighting accidents could occur were the trainmen to give the proper care and attention to the passengers. The platform man is put on the platform to furnish the highest degree of safety in his power, which means to furnish the passengers with every possible attention and assistance. In connection with these alighting accidents it is well to remark that the taking of names and addresses of passengers who slip and fall or are thrown in alighting and the presentation of a complete report in each case is of inestimable value to the company. Often the first intimation the company has of an accident is the notice of a suit having been filed. The disadvantage under which the company labors from then on is apparent, as the case has not been investigated and the balance is all on the side of the complainant. You platform men owe passengers the greatest degree of safety with which it is possible for you to surround them. And the last thought is best—do not forget that your company has you continually in mind and is watching your safety record.

No matter what the difficulty that arises in connection with your work, no matter how badly you want to cut loose and say precisely what you think, always put a smile in your voice and you will notice the difference in the manner of the passengers toward you.

The smile on the face of a conductor is unusual and therefore it is bound to draw attention and favorable comment. This is because the strain of handling a thousand and one different dispositions, a thousand and one different problems during the day is calculated to be wearing on the nerves. However, the conductor who can face his passengers with a smile on his lips and answer questions civilly is immediately recognized as being of the stuff that makes superintendents.

HOT-WEATHER COURTESY

ONE of the first things that a platform man must impress indelibly upon his brain, if he wants to be able to observe to the best advantage the immensely important rule laid down by his company—that of courtesy—is that he must take the world as he finds it and not as he thinks it should be. If he finds it to be so radically different from the way he thinks it should be, the best method that he can pursue toward educating it is to set a powerfully good example. It is the duty of every man whose daily work brings him into close touch with the public to be courteous and considerate first, last and always. He owes it, of course, to the company whose uniform he wears, but he owes it more so to himself. His success lies in being marked for his courtesy, and should he fail his progress cannot be very phenomenal. Hot-weather courtesy is most to be prized, because it is hardest to deliver. The hot days eat into the good temper of all of us, and so a man who can grin and speak courteously, even though his collar is lying in folds about his perspiring neck, is much to be admired. And he'll get his reward.

"BIRDS OF A FEATHER"

IT often is said that a man is known by the company he keeps; equally true is it that a company is known by the men it keeps. If a company whose aim in life is to sell to the public transportation facilities offers cars manned by crews which do not look properly after the safety and comfort of the passengers, then that company cannot hope to draw to its lines any great number of satisfied, regular patrons. Discourteous, thoughtless handling of passengers, especially during the hot-weather months, when almost everyone is on the ragged, nervous edge most of the time, cannot mean but one thing—dislike for the transit facilities the company offers. Remember always, Mr. Motorman, Mr. Conductor, you are representing your company when you step upon your platform to begin your day's work, and every discourteous, hasty word of yours is looked upon by the public as being a sort of phonographic utterance on the part of your company.

CHANGES OF ADDRESS

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



THE J.G. BRILL COMPANY

MAIN OFFICE
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LONDON OFFICE: 110 CANNON STREET, E.C.

CABLE ADDRESS "AXLES," LONDON

AMERICAN CAR COMPANY, ST. LOUIS, MO.
G.C. KUHLMAN CAR CO., CLEVELAND, OHIO
JOHN STEPHENSON CO., ELIZABETH, N. J.
WASON MANFG. CO., SPRINGFIELD, MASS.

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CABLE ADDRESS: "BOGIBRIL"

AGENCIES

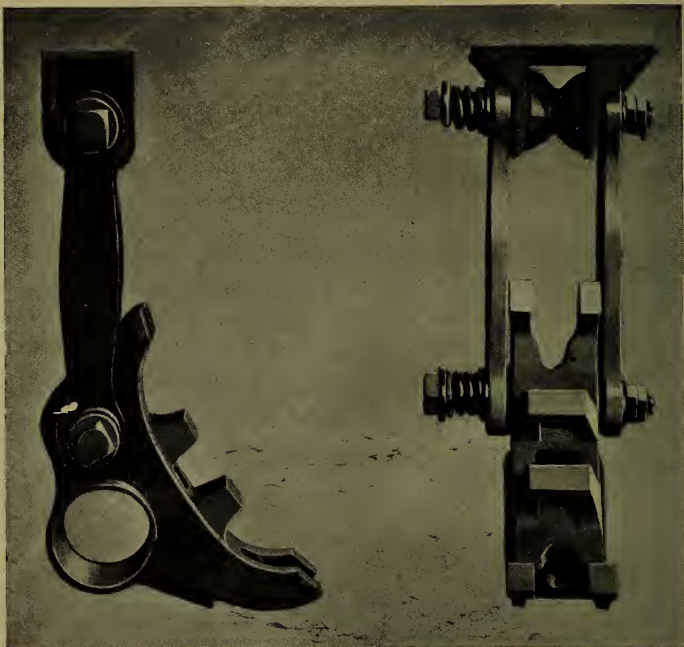
AUSTRALASIA—Noyes Brothers, Melbourne, Sidney, Dunedin, Brisbane, Perth

BELGIUM AND HOLLAND—C. Dubbelman, 48
Rue de Luxembourg, Brussels

ARGENTINE AND URUGUAY—C. S. Clarke &
Co., Calle Bartolome Mitre 478, Buenos Aires

NATAL, TRANSVAAL AND ORANGE RIVER
COLONY—Thomas Barlow & Sons, Durban, Natal

ITALY—Giovanni Checchetti, Piazza Sicilia 1, Milan

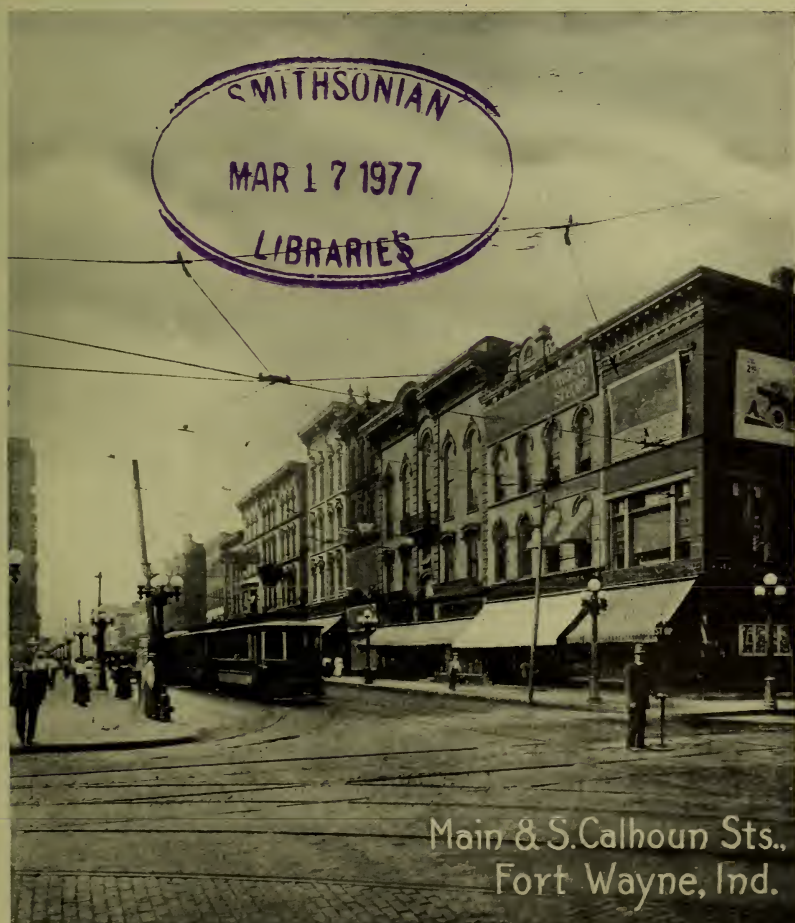


“HALF-BALL” BRAKE HANGER

JOLT—rattle—thump—shiver—the car comes to a quivering standstill. Shiver—thump—rattle—jolt—it starts again. And that process is repeated every time it is necessary to take on or discharge passengers. Those passengers do not know or care what causes such uncomfortable riding, but at the end of their journey they are pretty well shaken up and certainly not very favorably impressed with the service rendered. The fault lies with the ordinary brake hangers used—unable to hold the shoes in alignment and setting up fiendish vibrations with each application of the brakes. The remedy—Brill “Half-ball” Brake Hangers.

THE J. G. BRILL COMPANY, PHILADELPHIA

BRILL MAGAZINE



Main & S. Calhoun Sts.,
Fort Wayne, Ind.



BRILL TWILL-WOVEN RATTAN

THERE is nothing that is so objectionable to the riding public as worn, shabby, dirty-looking seats and seat-backs. That is because the seats and backs come into closer contact with the passenger than does any other part of the car. The passenger may excuse a dirty-looking, scarred, paintless flooring; he may overlook a very apparent need of varnish or paint; he may excuse even a car full of grimy windows, but as for a collection of worn, spotty, dull, shabby seat coverings—that is where he has to sit. Therefore, it would seem logical to place the matter of renewal of seat and seat-back coverings among the front rank of questions for consideration. Brill twill-woven rattan, canvas-lined for cushions and unlined for seat-backs, is made in all widths from 18 to 36 inches and is made right to give satisfactory service.



Wm. Bylesby

PRESIDENT, H. M. BYLESBY & CO., CHICAGO

There is a large amount of undeveloped water power in the United States and this power, when developed, will accomplish a pronounced economic gain to the country at large, and specifically to the communities in which the development takes place or in which the product is sold. These water powers, as long as they remain idle, represent a direct economic waste because, if they were developed and were manufacturing useful power, they would either reduce the consumption of coal and thus conserve a natural resource of certain definite, but limited, proportions or in other cases would furnish power for at present non-existent enterprises, which would add to the prosperity of the communities served, of the country at large, and increase the total wealth of the country.

One of the principal reasons for this stagnation, this undevelopment of these natural resources, is the attitude of the Federal Government and, in many cases of the state governments, relative to the legislation enacted, interpreted or threatened.

Regulation by arbitrary governing bodies, without equal protection against unfair and uncalled for competition and without protection against unfair taxation, and without any provision to allow the corporation, under these regulations, to profit reasonably by prosperous periods to enable it to tide over the inevitable lean years, appears to be as unworkable and anomalous and altogether hateful as taxation without representation.

—From an address delivered by Mr. H. M. Byllesby to the Investment Bankers Association of America, at Denver, September 21, 1915.

AUGUST 15, 1916

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HENRY MARISON BYLLESBY

HENRY MARISON BYLLESBY was born at Pittsburgh, Pa., February 16, 1859, a descendant of the family of Byllesby, of Bilsby, in County Lincoln, England. He was educated in the public schools of Pittsburgh and at Lehigh University, but did not graduate. He began his professional career in the employ of the Corliss Engine Works of Robert Wetherill & Co., of Chester, Pa., and the Edison Electric Light Co. He made all of the drawings and many of the designs for the first central station in New York City, one of the first two electric central stations to be built. Subsequently he had charge of the Edison Company's operations in Canada, and served as representative of that organization at different points in the United States. During 1885-'90 Mr. Byllesby was first Vice-President and General Manager of the Westinghouse Electric & Manufacturing Co., of Pittsburgh, and also Managing Director of the Westinghouse Electric Co., of London, England. He was at one time first Vice-President of the Electric Vehicle Co., of New York City; Vice-President of the Washington Light and Traction Co., Washington D. C.; and first Vice-President of the General Electric Co. at Portland, Ore., which latter company he organized in 1892 and was largely instrumental in financing and constructing. In 1902 he organized in Chicago, Ill., the firm of H. M. Byllesby & Co., engineers, to operate and manage public utility companies. The company has branch offices in New York City and Tacoma, Wash. Mr. Byllesby is President of the Northern States Power Company and of the Standard Gas & Elec. Co., Chicago. He is also an officer and Director of the Mobile (Ala.) Electric Co.; the Fort Smith (Ark.) Light & Traction Co.; the Oklahoma Gas & Electric Co., Oklahoma City, Okla.; the Enid (Okla.) Electric & Gas Company; the Muskogee (Okla.) Gas & Electric Co.; the Ottumwa (Ia.) Railway & Light Co.; the San Diego (Cal.) Consolidated Gas & Electric Co.; the Tacoma (Wash.) Gas Co.; the Northern Idaho & Montana Power Co.; and a Director of the Chicago, Milwaukee & Puget Sound Railway Company and the Bellingham & Northern Railway Company, the Public Service Co. of London, England, and the Public Utilities Corporation of Boston, Mass. He is a member of the National Electric Light Association, American Society of Civil Engineers, American Society of Mechanical Engineers, American Society of Electrical Engineers, Western Society of Engineers, and the National Civic Federation. He is a member of the Chicago Club, the Union League Club, The Midday Club, the University Club and the Glenview Club of Chicago; and of the Bankers, Metropolitan, Lawyers, Railway and Recess Clubs of New York City.

INTERURBAN CENTERS AND INTERURBAN CARS

FORT WAYNE



NE hundred twenty-seven miles north-east of Indianapolis, at the junction of the St. Joseph and St. Mary and Maumee Rivers, is located

the city of Fort Wayne, seat of Allen County, Indiana, and one of the most enterprising cities of the state, being among the leaders in population, manufacturing, industries and commerce. Its proximity to Indianapolis, Chicago and Toledo (the distance to Chicago is one hundred fifty miles and to Toledo one hundred miles) helps increase its importance. Seven railroads enter the city, and this service is supplemented by four interurban electric railway companies carrying both freight and passengers. These are the Fort Wayne, Van Wert & Lima Division of the Ohio Electric System, Fort Wayne & Northern Indiana Traction Company, Fort Wayne & Northwestern Railway and the Fort Wayne & Springfield Railway Company. Good freight rates—especially in transcontinental shipments—are enjoyed by the city, and these of course encourage development of manufacture.

The city is situated in the heart of a rich agricultural region. Its

growth has been steady, although comparatively slow. The city was never a boom town; during its advancement, both in population and industries, it has travelled along conservative lines. In 1880 the population was 26,880; in 1890 it had increased to 35,393; in 1900 it was 45,115 and in 1910 the census returns showed a total of 63,933, the present estimated population being about 75,000. The city covers about six square miles, of which 46 acres are in parks. The streets, cutting each other at right angles, are broad and bordered by many shade trees.

Fort Wayne is recognized as one of the most important railway centers in the Middle West, and several railroads maintain their principal car and repair shops in the city, adding materially to the value of its manufacturing industries. In 1905 the city ranked first among the cities of the state in value of cars constructed and repaired by steam railroads. The city also has foundries and machine shops, iron and steel mills, planing mills, sash and door industries, etc. In 1905 the factory value of these products was \$15,129,562.

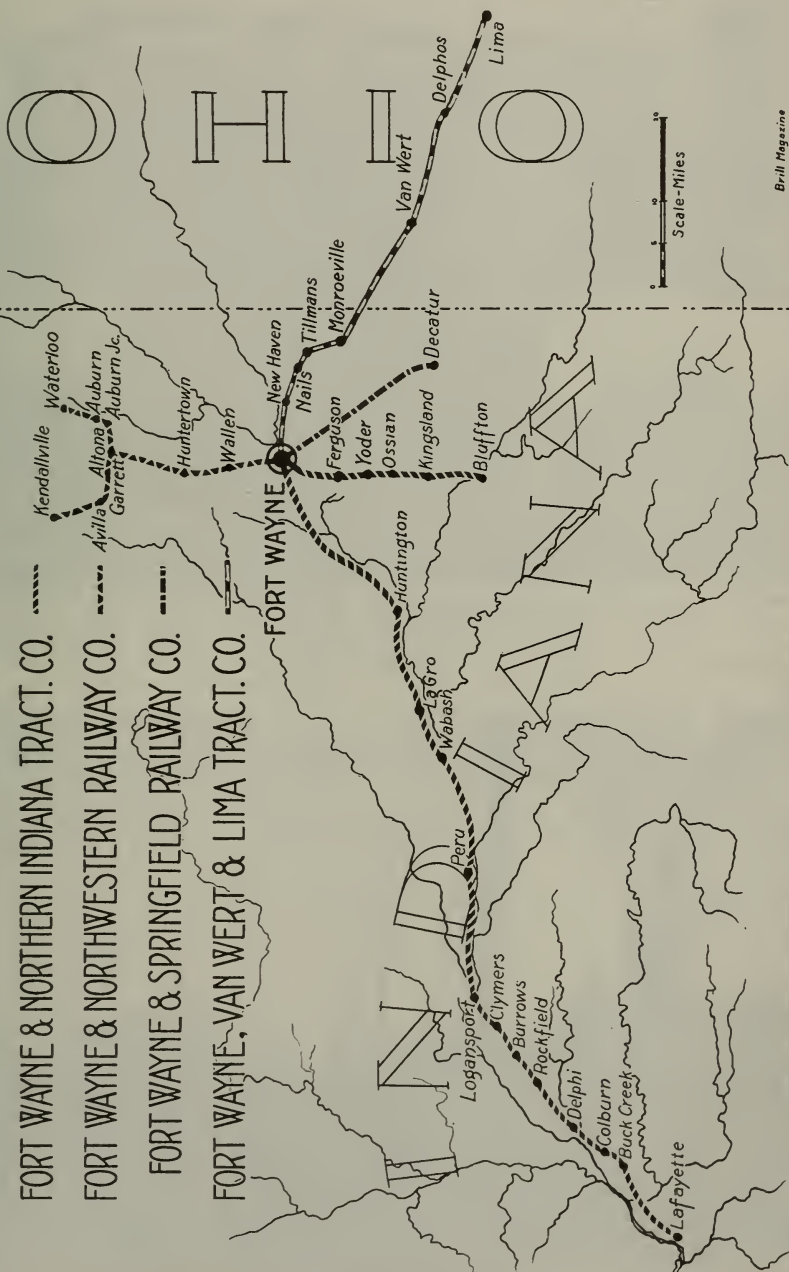
In 1680 the site upon which the city now stands was occupied by a French trading post. This post figured throughout the Indian wars. The first permanent settlement was made in 1815. The town was made the county seat in 1824 and in 1840

FORT WAYNE & NORTHERN INDIANA TRACT. CO.

FORT WAYNE & NORTHWESTERN RAILWAY CO.

FORT WAYNE & SPRINGFIELD RAILWAY CO.

FORT WAYNE, VAN WERT & LIMA TRACT. CO.



Brill Magazine



INTERURBAN CENTERS AND CARS. Interurban Building at Lima, Ohio—
Ohio Electric Lines

it was chartered as a city. The Wabash & Erie Canal, opened in 1843, did much to stimulate the growth of the city.

The Fort Wayne & Northern Indiana Traction Company, besides being one of the four companies which furnish a splendid interurban service to the city, supplies

many consumers with electric light and power. The service rendered by the company totals 86 miles of city track and 135 miles of interurban, operating 14 interurban cars. The company owns and operates Robison Park, containing about 275 acres of landscaped grounds and five buildings. The



INTERURBAN CENTERS AND CARS. View showing shelter station on Ohio Electric



INTERURBAN CENTERS AND CARS. Sub-station and passenger station at Convoy,
Ohio—Ohio Electric Lines

park, six and one-half miles from the densest traffic point in the city, is reached by the city car line.

In addition to its interurban service the company operates city service at Fort Wayne, Wabash,

Peru, Logansport and Lafayette. Its interurban lines link together Fort Wayne; Bluffton, 4,800; Huntington, 13,500; Wabash, 8,700; Peru, 11,000; Logansport, 19,000; Delphi, 2,500; Lafayette,



INTERURBAN CENTERS AND CARS. Bridge over Anglaise River—Ohio Electric Lines



INTERURBAN CENTERS AND CARS. View on Ohio Electric, showing block signals

26,000, and other smaller towns. The company makes connections with Fort Wayne's other three interurbans at Fort Wayne, at Peru, Bluffton and at Logansport it makes connections with the Union Traction of Indiana and at Lafayette it connects with the Terre Haute, Indianapolis and Eastern Traction Company.

Current for the operation of the line is generated at the company's powerhouses in Fort Wayne and Lafayette, the powerhouse at Fort Wayne having a present capacity of 18,000 kw. and that at Lafayette a capacity of 2,000 kw. Both installations are steam plants. The transmission voltage is 33,000 volts, which is stepped down to a line-operating voltage of 550. Substations for this purpose are located at Fort Wayne, Roanoke, Huntington, LaGro, Boyd Park, Peru, Logansport, Burrows, Delphi, Buck Creek, Yoder, Kingsland, Bluffton and Lafayette.

The standard cars in use by the company are built on



INTERURBAN CENTERS AND CARS. Interior of sub-station at Auburn, Indiana—Fort Wayne & Northwestern



FORT WAYNE & NORTHWESTERN
Exterior and interior of power plant at Kendallville, Indiana



INTERURBAN CENTERS AND CARS. Standard car of Fort Wayne & Northwestern

both wooden and composite underframes, with wooden sides, and are designed for single-end operation. They measure 55 ft. over the vestibule, 59 ft. over the bumpers, 8 ft. 9 in. over the side sheathing, have a seating capacity of 60 and weigh from 40 to 50 tons fully equipped, including car and trucks.

With the exception of a stretch of track two miles long near Peru, which is laid on a public highway,

the tracks of the company are laid on private right-of-way. This makes possible a maximum speed of 50 miles per hour and, because of the number of stops averaging reasonably small (one to the mile), a good schedule is maintained. Light freight and Adams and Wells-Fargo Express are handled.

During the last year the traffic statistics of the company showed a total of 3,481,524 carmiles as against a total of 17,790,916 reve-

nue passengers carried. The interurban lines showed a total of 1,260,267 carmiles with a total of 232,201 freight carmiles.

The Fort Wayne & Northwestern Railway operates from Fort Wayne to Garrett, Garrett to Kendallville and Garrett to Waterloo. The total tributary popu-



INTERURBAN CENTERS AND CARS. Interior of Fort Wayne & Northwestern passenger car



INTERURBAN CENTERS AND CARS. Transfer corner at Garrett, Indiana—Fort Wayne & Northwestern

lation of the road is estimated at about 93,000, the cities and towns in between the terminals totaling 11,500. The lines of the company are forty-one miles long and laid entirely on a single-track roadbed. The company generates its own current at Kendallville, where it has a steam-power plant with two 800-kw. units and with capacity for double that total. The current is transmitted at 33,000 volts and sent out over the line at 650 d.c., substations being located at Kendallville, Auburn, Vandalia and Wallen.

The standard car in use by the company measures 50 ft. over the vestibules, 52 ft. over the bumpers, 8 ft. 6 in. over the side sheathing,

has a seating capacity of 47, a car-body weight, including brake and electrical equipment, of 48,000 lb., and a total weight of 87,120 lb., including car and trucks fully equipped. The underframe is of wood and the cars are designed for single-end operation, being run singly.

Outside of the cities served by



INTERURBAN CENTERS AND CARS. Fort Wayne power station of Fort Wayne & Northern Indiana Traction Company



Logansport Country Club
Looking west from La Gro station



Overhead bridge over Wabash R. R. near Logansport
Looking west toward Logansport Country Club



FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY



INTERURBAN CENTERS AND CARS. Fort Wayne freight station—Fort Wayne & Northern Indiana Traction

the company, the lines are laid on private right-of-way, highways not being used on any part of the route. Thus, with its low number of stops (they average about two per mile) the company is able to drive its equipment at a good rate

of speed, the maximum being about 45 miles per hour. Both freight and express service are conducted.

The Fort Wayne, Van Wert & Lima Traction Company is a line which is leased by the Ohio Electric Railway Company and operated as



INTERURBAN CENTERS AND CARS. Standard car in use on lines



INTERURBAN CENTERS AND CARS. Substation and passenger station at Yoder
Fort Wayne & Northern Indiana Traction

a division of the company. The line runs from Lima to Fort Wayne through Elida, Delphos, Middlepoint, Van Wert and Monroeville into Fort Wayne, making a total of 65 miles of single track with turnouts. The power is produced through substations on this line, being purchased from the Western Ohio Railroad Company, whose powerhouse is located at St. Marys. The standard car of the Ohio Electric, measuring 61 ft. over all, is

used on the division, being similar to that in use throughout the balance of the property.

Passenger, freight and express business is carried on this line, a one-hour headway being operated throughout the daylight hours, or about fifteen trains each way per day. With a low average number of stops (about one to the mile), the limiteds run by the company make the sixty-five miles in about two hours and ten minutes. The

roadbed is laid for the most part on private roadway, highways being used through some of the villages.

The Fort Wayne & Springfield Railway Company connects Fort Wayne



INTERURBAN CENTERS AND CARS. Typical freight station



INTERURBAN CENTERS AND CARS. La Gro station and substation

with Decatur, whose population is about 4,500, and depends largely upon travel between its terminals, the intermediate territory being without sizable cities or towns.

The company generates its own current at its powerhouse in Decatur, sending the current out over its 22 miles of line at 6,600 volts, both transmission and operating. Its power installation has a capacity of 500 horsepower, the method

of power generation being steam. The cars of the company, three in number, are run singly.

Milk and light freight service forms a considerable portion of the business done by the company, the freight mileage for the last year totalling 38,117, as against a passenger car mileage of 76,233. Compared with this latter figure, the company carried 157,139 passengers.

On some single-track roads, as a safety precaution, the cars are operated so that the passengers leave at the left-hand side of the car. The majority of people being right-handed, it is natural to grasp the grabhandle with that hand and, being on the left side of the car, this turns the passenger so that he faces front and when his feet strike the pavement he is able to overcome whatever difference in momentum there may be by running or stepping forward

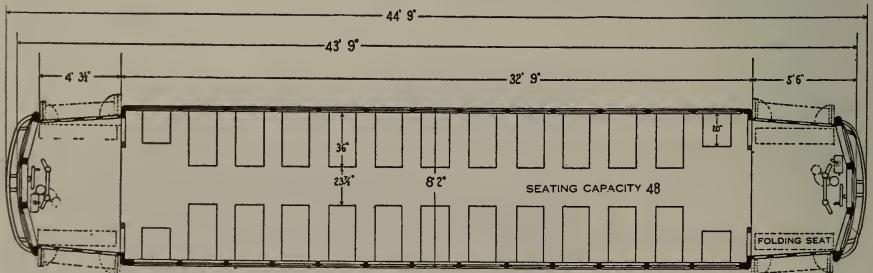


STEEL-FRAME CARS FOR WEST CHESTER, PA.

BRILL 77-E TRUCKS

TWO 32 ft. 9 in. closed steel-frame vestibule motor cars have been completed and delivered to the West Chester Street Railway Company by the J. G. Brill Company. These cars, immediately upon their receipt, were placed in service on the interurban line of the company, running between West Chester and Coatesville. On this line, as well as on its other interurban branch, connecting West Chester with Kennett Square, the company faces a very

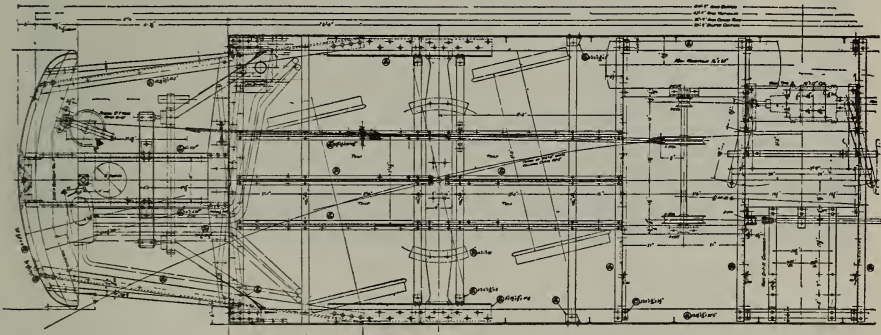
difficult problem in the fluctuation of the demand for traffic facilities. To what extent this fluctuation exists may be seen from the fact that although the company keeps a total of twelve cars available for immediate use, maintenance of its schedules requires the regular operation of but half that number, two cars being sufficient to care for the Kennett line ordinarily and four cars for the Coatesville division. On the latter line but two cars were operated regularly until



STEEL FRAME CARS FOR WEST CHESTER. Height from track to under side of side sills, 36 $\frac{1}{4}$ in.; height from floor to center of headlining, 8 ft. 1 $\frac{1}{8}$ in.; track to step, 13 $\frac{3}{8}$ in.; step to platform, 13 $\frac{1}{2}$ in.; platform to floor, 10 $\frac{1}{8}$ in. with ramp of 2 $\frac{3}{8}$ in.; weight of trucks, 13,120 lb.; weight of motors, 10,800 lb.; weight of body complete, 44,900 lb.

very recently, the two new cars being put into service so as to make the schedules a little more frequent. Despite the fact that these two lines require but six cars regularly, the entire equipment of twelve cars is maintained in first class running order because of the unexpected demands for increased service which frequently are made on the company. At Lenape, on the Kennett line, about four miles from West Chester, there is located

nals, which are 14 miles apart. As a consequence the patrons of the line are not grouped as they would be if there were a number of towns or villages; instead they are more widely separated, and therefore the company has to contend with the difficulty of a very large number of stops with a comparatively small number of passengers to each stop. Between West Chester and the outskirts of Downingtown, a distance of about eight miles, the cars



STEEL FRAME CARS FOR WEST CHESTER. As an indication of the fluctuation of the traffic demands, the company has to keep twelve motor cars in perfect running order so as to care for unexpected demands for service, whereas it requires but half that number to maintain the regular schedules of the line

an amusement park, which is used for picnics and excursions. This naturally increases the traffic totals of the company, but the traffic to it, being irregular, is of course not so desirable as a smaller but steadier, more regular, traffic which is furnished electric railway companies maintaining amusement parks at other places.

The territory between West Chester, whose population is 12,000 and Coatesville (11,000) is entirely rural with the exception of Downingtown (3,500), located half way between the two termi-

of the company make forty-two stops. However, for the run of fourteen miles between West Chester and Coatesville, with an average of more than five stops to the mile, a schedule of fifty-five minutes is maintained.

Another feature of the service is the school children travel from the rural districts to the towns and return. Commutation rates are made to these children, but to all other passengers the fare is fifteen cents from West Chester to Downingtown and ten cents more from Downingtown to Coatesville. In



STEEL FRAME CARS FOR WEST CHESTER. The company, in addition to the handicap under which its interurban lines are operated, is obliged to maintain a local operation in West Chester, by reason of the terms of the original franchise

West Chester crosstown service, necessary because of the terms of the original franchise, is maintained by means of one single-truck car. This service is a drain on the company, but the use of the single-truck car lightens the burden considerably, the operation cost of course being less than if a heavy, double-truck car of the company's standard type were used.

The cars are built on underframes on which 5 by 3½ in. angles are used for the side sills, the long leg being laid horizontal and reinforced at the bolster with a 6 by 3½ in. angle fastened to the horizontal leg of the sill. The end sills are of 3/16 in. pressed steel and the crossings are ⅛ in.

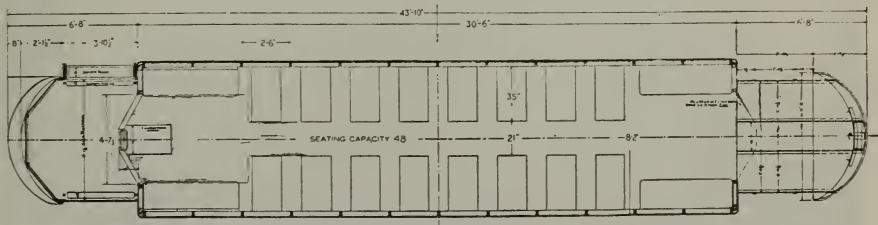
The bolsters are of cast steel bolted to the side sill and the reinforcing angle. In the platform the outside knees are of 7 by 3½ in. angle reinforced with 2 by 2 in. angle under the end sill and the center knees are of 4 in. channel extending from the end sill to the bumper.

In the body frame the corner posts are of 3/32 in. steel extending from the sub tee post entirely around the corner and up to the side of the bulkhead opening. The side posts are of 1½ by 2 in. tees tapering from 3/16 to ¼ in. and extending from side sill to top rail. Above the top rail the steel U-shaped rafters extend the full length of the car, supporting the Brill Plain Arch Roof.

BRILL 39-E TRUCKS

photographs of which are shown herewith, the company has ordered five more cars which are almost exact duplicates, with the exception of a few minor changes in the brake rigging and the underframe construction. This second order will be mentioned later in BRILL MAGAZINE when it has been completed.

The cars are typical closed vestibule motor cars, with a length over body of 30 ft. 6 in. They are built on underframes which are con-



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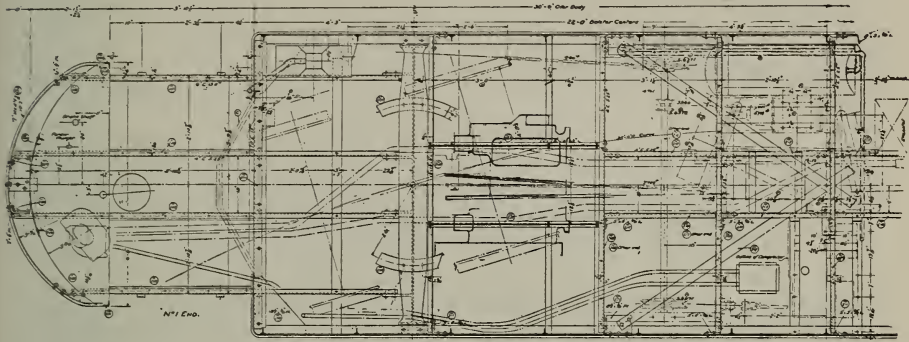
structed of steel throughout. The side sills are of 5 by 3 in. angle, the crossings of 4 in. channel extending the full width of the car, from side sill to side sill, the diagonal braces used are of 3 by $\frac{3}{8}$ in. steel bars and the body bolster is of cast steel arranged to take the center and outside platform knees. These outside platform knees are also of 6 in. channel and the center platform knees are of 4 in. channel, both outside and center knees being bent down under the end sills, to which they are anchored by means of suitable stirrups and bolts. The trap door openings are framed in the customary manner,

to make the flooring substantial.

In the body frame the side posts are of $1\frac{1}{2}$ by 2 by $\frac{3}{16}$ to $\frac{1}{4}$ in. tees, extending in one piece from side sill to side sill, being shaped so as to form the roof rafters. The letter boards are of poplar fastened to the side posts. Sheet steel, reinforced with angle iron, is used for the bulkheads and the window sills are of white oak, as are also all post fillers, the sills being made narrow so as to give as much width as possible to the car's interior. In the platforms the posts are of 2 by 2 by $\frac{1}{4}$ in. tees and 2 by 2 by $\frac{1}{4}$ in. angle, the tees being used for the center posts and the angles for



NEW CARS FOR DAYTON, OHIO. This order has been supplemented by a second order for five more cars, the design of which is practically the same



NEW CARS FOR DAYTON, OHIO. The underframes on which these cars are built are made of steel shapes. The roof is of the Brill Plain Arch Type

the door posts. The steel girder plate is 29 in. wide and is spliced at the corner posts. The top cord of the girder plate is $3\frac{1}{2}$ by $\frac{5}{8}$ in. in one continuous piece and the end plates are of 33 by $\frac{3}{16}$ in. steel bent around the corner posts and battened to the side girder with $2\frac{1}{2}$ in. plates.

The roof is built with automatic bulkhead ventilators, the hoods being detachable and set down from the top of the carbody so as to provide for the installation of the ventilators. The roof is of the Plain Arch Type and is equipped with all appliances fully to protect it from injury. Trolley rope guards are provided at each end of the car, extending from one vestibule corner post to the other, trolley boards extend the full length of the roof, hooks are installed to hold the idle trolley down and guards are attached to the roof to prevent the trolley from striking the wooden roof.

Inside the cars are finished in cherry, stained mahogany and the entire finish is of what is known as the "sanitary" type, all dust-

and dirt-collecting corners and crevices being done away with. Twelve windows, with straight heads, are placed on each side of the car, each window provided with double sash, the upper sash running continuously the full length of the car and the lower sash arranged to raise.

The vestibules are round-end and are sheathed on both outside and inside with sheet steel. Each vestibule is provided with three windows, arranged in the customary manner, the two outside sashes arranged to drop and the center sash equipped so that the motor-man may adjust it at any desirable height, a rack being provided for that purpose. The vestibule doors are four-leaf, made in two sections, so as to fold against the vestibule corner posts and the body corner posts. The steps, which are covered with safety tread, operate, as is usual, in conjunction with the folding doors.

Brill "Winner" Seats, which owe the greater part of their popularity to their lightness in weight, were specified.

PREPAYMENT STEEL CARS FOR STEUBENVILLE, WELLSBURG & WEIRTON RAILWAY

BRILL 77-E TRUCKS

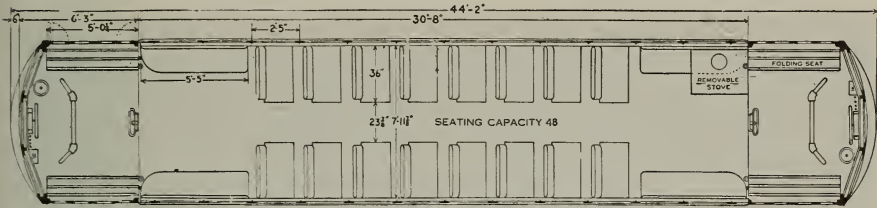
THE Brill Company has delivered to the Steubenville Railway Company, of Steubenville, Ohio, three 30-ft. 8-in. prepayment steel vestibule motor cars mounted on Brill 77-E Trucks, which cars are for use by the Steubenville, Wellsburg & Weirton Railway Company, the latter company leasing the equipment from the Steubenville Railway. The Steubenville Railway Company is not an operating company, but it owns the tracks over which the Steubenville, Wellsburg & Weirton operates. The new equipment has been bought by the company to replace a part of its old equipment, and will take the place of some single-truck cars which have been in use by the company

and which are not so well adapted to the interurban service. The new equipment is somewhat similar in type to the double-truck cars at present in use by the company; this old double-truck equipment will be remodeled for pay-as-you-enter service and will be retained for operation in conjunction with the new cars.

The company operates two divisions, one running from Steubenville to Weirton, a distance of about six and one-half miles, and the other from Steubenville to Wellsburg, a little more than seven miles. The tracks of each division join at the east end of the Steubenville bridge and run into Steubenville on the same track. The terminus (Steubenville) has a



SEMI-CONVERTIBLE CARS FOR STEUBENVILLE, OHIO. These cars are to be used principally to replace old single-truck cars which have been in use by the company but which are not so well adapted to interurban service. They will supplement the equipment of old double-truck cars, which are to be changed for Pay-As-You-Enter operation



SEMI-CONVERTIBLE CARS FOR STEUBENVILLE, OHIO. Height from track to underside of side sills, 3 ft. 0 1/2 in.; height from underside of side sills over trolley boards, 8 ft. 9 3/4 in.; height from floor to center of headlining, 8 ft. 1 1/2 in.; track to step, 15 in.; step to platform, 11 in.; platform to floor, 11 1/2 in.; weight of trucks, 12,750 lb.; weight of motors, 7,600 lb.

population of about 30,000; Weirton has about 3500, as has also Hollidays Cove; Follansbee, on the Wellsburg Division, has about 3000 and Wellsburg's population totals in the neighborhood of 6500. On the Wellsburg Division the company has an additional stimulus to business in the form of a connection with the Pan-Handle Traction Company, which runs into Wheeling, thus making a good through service from Steubenville to Wheeling.

The Weirton Division is rather unusual in that it has practically no tributary population intermediate to its terminals, there being about four miles of the route which runs along the hillside with scarcely any population. Thus the division depends practically upon the population of its termini. The same barren condition between terminals holds true of the Wellsburg Division, although perhaps not in so marked a degree. Between Steubenville and Follansbee there is a stretch of about two and one-half miles where there is little or no population, and between Follansbee and Wellsburg there is another stretch, of about two miles, on which the company picks up

but very little travel. However, throughout the entire Ohio Valley, and especially in this section, there is more building than ever before in operation, mills and factories being in course of construction.

The schedules of the interurban divisions, as well as those of the urban and suburban service, are interesting. At present a half-hour schedule is being maintained on the Wellsburg Division by means of three cars, whereas on the Weirton Division, practically the same length run, a half-hour schedule is maintained by means of but two cars. In the city service the cars of the company make approximately six and one-half miles per hour, with a total of sixty-four stops, and on the suburban service a schedule of about nineteen miles per hour is maintained, with a total of twenty-eight stops. Traffic statistics show that the company operates about 30,000 car miles per month, with an average of 170,000 passengers carried per month.

The company purchases high-voltage current for the operation of its lines, this current being transformed to the proper line-operating voltage in the company's



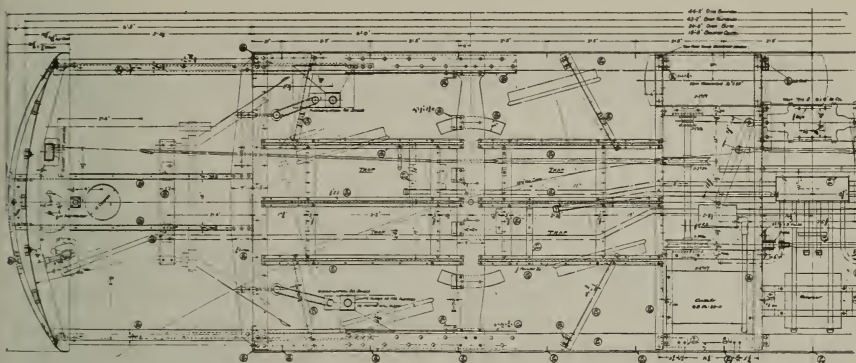
SEMI-CONVERTIBLE CARS FOR STEUBENVILLE, OHIO. Steubenville has a population of about 30,000 and the other towns served by the two interurban divisions of the company have a population which totals about 15,000

own sub-station. Single-truck equipment is used in the town of Wellsburg to supplement the service of the interurban cars, the single-truck cars operating in between the interurbans, thus giving a fifteen-minute local service in Wellsburg.

The cars are constructed on steel underframes in which the side sills are of angle, with the long leg (5 in.) set horizontally. To relieve the strain on this horizontal leg of the sill angle at the bolster, a reinforcing angle measuring 6 by 3½ by 5/16 in. is used. The end sills are of 3/16-in. pressed steel, and the crossings are of 1/8-in.

pressed steel. The cast steel bolsters are perforated to allow the passage of brake rods, cable conduits, etc. The outside platform knees are of angle whose longest leg measures 7 in., and they are reinforced under the end sill with 2 by 2 by 3/16-in. angle. The center platform knees are of 4-in. channel.

The platform openings are enclosed with a four-leaf folding door, one section folding out against the vestibule corner post and the other section folding against the body corner post, the steps folding with the doors. In the body framing of the car 1½ by



CONVERTIBLE CARS FOR STEUBENVILLE, OHIO. The Weirton Division of this road is diametrically opposed in nature to the operation of the West Chester Street Railway, an article describing the operation of which appears in this issue. On the former there is a long stretch on which there are practically no stops, the travel being all picked up at the end of the line, whereas on the latter the stops are far more frequent than on the average line, forty-two stops being made in one run of eight miles

2 by 3/16 to 1/4-in. tees are used as side posts, extending from the side sill to the top rail and riveted to each; the belt rail is of 3 by 1/2-in. steel and the top rail of 2 1/2 by 2 1/2 by 1/4-in. angle extending the full length of the car. The car is sheathed with 3/32-in. sheet steel. The roof is of the Plain Arch type, strengthened with U-shape pressed steel rafters extending the full width of the roof, one rafter at each side post. In this roof are set six Brill Exhaust Ventilators, three placed down each side. Other Brill specialties include Dedenda Alarm Gongs, Brill Signal Bells, Winner Seats and Brill Patent Push Buttons.

The cars are mounted on Brill 77-E Trucks, especially designed for low-level cars. This truck has been used in the main for cars with 22- or 24-in. wheels, but in this case it has been used with larger wheels (30-in.) so as to allow for clear-

ances over some peculiarities of road-bed construction. In general the car is somewhat similar to the type of car built for the Wilmington & Philadelphia Traction Company, which cars were described in BRILL MAGAZINE for May, 1916. The chief difference in the cars is that the Steubenville, Wellsburg & Weirton equipment is swung higher from the ground than was the case in the Wilmington cars.

In the latter case, the car was brought down so that a very short step carries the passenger on to the platform, making loading and unloading much quicker and also fostering public favor. The public of the cities in which the cars have been operated—Wilmington, Del., and Chester, Pa., has shown its thorough approval of the type, as have also the officials of the company, who have found that coasting performances of the cars are remarkably good.

COMBINATION CARS FOR CHAMBERSBURG, GREENCASTLE & WAYNESBORO

SEMI-CONVERTIBLE TYPE

TO partially replace four cars destroyed by a fire which swept the car barn of the company last February, The J. G. Brill Company has delivered to the Chambersburg, Greencastle &

the company crosses the beautiful Cumberland Valley to Chambersburg, seat of Franklin County. Here is located Wilson College, an educational institution for young women, whose student body helps

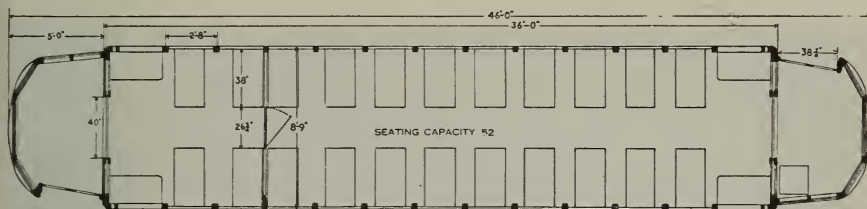


SEMI-CONVERTIBLE CARS FOR CHAMBERSBURG, GREENCASTLE & WAYNESBORO. These cars are to replace partially four cars which were burned in a car barn fire last February

Waynesboro Street Railway Company two 36-ft. Semi-Convertible combination passenger and smoking cars. These cars are designed for interurban service, running between Chambersburg, Pa., and Blue Ridge Summit, a run of about two hours for a distance of about thirty miles. Originally the company's lines terminated at Pen Mar, a resort which gets its name from its location on the Pennsylvania-Maryland state line. Recently, however, the trackage was extended to make Blue Ridge the terminus of the line. The line of

to swell the patronage of the line.

The schedule maintained by the company provides a train every hour from six o'clock in the morning until eleven in the evening. Pleasure seekers from Chambersburg, Waynesboro and Greencastle, drawn to the scenery of Cumberland Valley and to Pen Mar, where is located an amusement park with the usual park equipment for fun-making and a large colony of cottages, and where also are held many church reunions, are the principal travelers, and travel on all of the company's



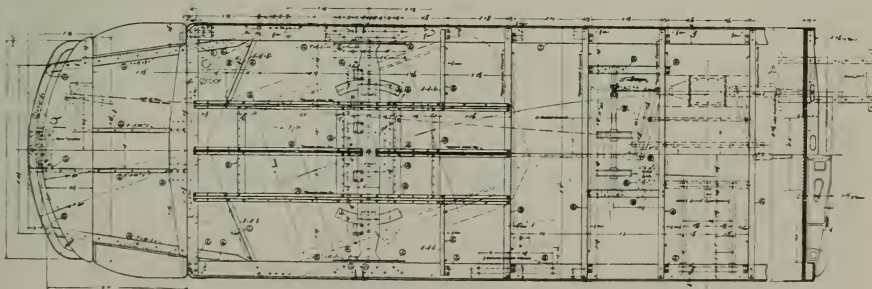
SEMI-CONVERTIBLE CARS FOR CHAMBERSBURG, GREENCASTLE & WAYNESBORO. Height from track to underside of side sills, 3 ft. $\frac{1}{2}$ in.; height from under side of side sills over trolley boards, 8 ft. 9 $\frac{1}{2}$ in.; height from floor to center of headlining, 7 ft. 11 $\frac{1}{2}$ in.; track to step, 12 $\frac{1}{2}$ in.; step to platform, 13 $\frac{3}{8}$ in.; platform to floor, 10 $\frac{1}{8}$ in. with 3 $\frac{1}{8}$ in. ramp

trains is remarkably heavy, as is attested by the traffic statistics, which show a total of 1,979,930 passengers with a total of 391,684 carmiles, a very good ratio.

Traffic is augmented further by connection at Shady Grove, a station on the company's lines, with the Hagerstown and Frederick Railway, thereby making a direct means of communication with such towns in Maryland as Williamsport, on the Potomac River, Hagerstown, Boonsboro, Mt. Lena, Myersville, Middletown, Jefferson and Frederick. In addition this region is served by several steam lines, bringing in from other points travelers who use the trains of the Chambersburg, Greencastle & Waynesboro. Chambersburg has

a population of 14,000, Greencastle 4,000, Waynesboro 11,000, and the population of the district directly tributary to the lines is about 16,000, which gives some idea of the operating conditions.

The cars are somewhat similar in design to the type of two combination passenger and smoking vestibuled cars built for the company in 1908 and described in BRILL MAGAZINE for September, 1908. With this order was included a combination passenger and baggage car, which is still in use by the company in handling packages and light freight. The new cars are larger than the old equipment, seating 52 passengers as against a capacity of 44 passengers for the old cars, and they dif-



SEMI-CONVERTIBLE CARS FOR CHAMBERSBURG, GREENCASTLE & WAYNESBORO. The cars are very similar in design to the old equipment of the company. These are somewhat larger, however



SEMI-CONVERTIBLE CARS FOR CHAMBERSBURG, GREENCASTLE & WAYNESBORO. Twelve passengers are provided for in the smoking compartment, a good feature for interurban service

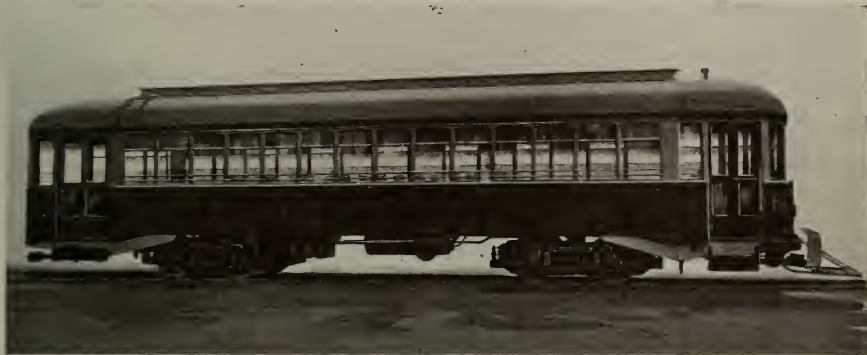
fer also in that they are of steel, whereas the old cars were all wood.

The cars are built on underframes in which side sills are of 6 by $3\frac{1}{2}$ -in. angle, the $\frac{3}{32}$ -in. steel side sheets extending to the belt rail. The end sills are of $\frac{3}{16}$ -in. steel plate pressed Z-shape and the crossings are of $\frac{1}{8}$ -in. pressed steel. The outside platform knees are of 7 by $3\frac{1}{2}$ -in. angle, reinforced with a smaller angle where they are bent down under the end sills and the center platform knees are of 4-in. channel, extending from the end sill to the inside of the bumper angle.

In the body frame the corner

posts are of oak and the vestibule center posts of ash, the body corner posts and the side posts also of ash. The remainder of the body framing, with the exception, of course, of the side sheathing, is of wood. The roof is of the Plain Arch type, of the usual construction, being supported on concealed steel rafters and covered with poplar boards and cotton duck.

The arrangement of the car provides for accommodations for twelve passengers in the smoking compartment and forty in the main passenger compartment, the two compartments being separated by a partition.



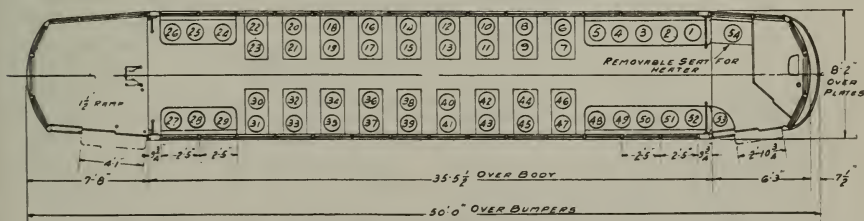
PREPAYMENT CARS FOR NORTHERN OHIO TRACTION

SEMI-STEEL CONSTRUCTION

FIVE semi-steel prepayment city cars, exact duplicates—with the exception of a few minor changes—of the type of an order of fifteen built in 1914 and described in BRILL MAGAZINE for December of that year, have been completed for the Northern Ohio Traction & Light Company by the G. C. Kuhlman Car Company, of Cleveland, Ohio. The article appearing in the December, 1914, issue of BRILL MAGAZINE contains a description of the operation of the company, which is supplemented by an article published in

January, 1916, and describing a more recent purchase of equipment which included a 60-ft., single-end baggage car and a 40-ft. double-end line car. The lines of the company begin at Cleveland and extend in a southerly direction so as to include a large mileage of track (about 230) and to serve such cities as Akron, Canton, Cuyahoga Falls, Massillon, New Philadelphia and Ulrichsville. The company also operates branches which take in Silver Lake, Ravenna, Barberton, Wadsworth and East Greenville.

The new cars will be used to

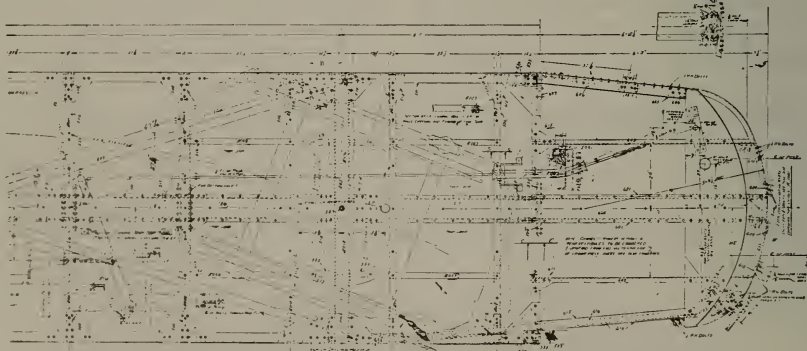


PREPAYMENT CARS FOR NORTHERN OHIO TRACTION. These cars are almost exact duplicates of the type of a previous order built for the company by the G. C. Kuhlman Car Company. Their design is well adapted to the service for which they are used, which statement is borne out by the fact that the type was an innovation when the first cars were built in 1914 and that the new cars form what is practically a repeat order

supplement the present equipment of the company, being placed in service in Akron, a city of 100,000 population. The operation of the company calls for an average speed of ten miles per hour. The transit system of the city is arranged so as to produce a uniform traffic density in the business district, which, like most cities, is the heaviest point.

This type of car was an innovation with the company when the first fifteen cars were built in 1914. That it has proved satisfactory, however, is clearly shown by the repetition of the design in this new order. The cars are designed for single-end operation. At the forward end of the car there is a platform of generous dimensions—6 ft. 3 in.—provided with a two-leaf folding door on its right-hand side. This platform is designed to be used only for exit, the motorman operating the folding doors and steps, which operate in unison. Entrance to the car is by way of the rear platform, which is even larger than the front—7 ft. 8 in.—and which therefore is well de-

signed for loading large groups of passengers. This platform is under the control of the conductor, who operates the folding doors and the single folding step. The door opening is divided in the center by a pipe stanchion which extends from the floor to the top panel, incoming passengers using the side of the stanchion farthest from the carbody proper and outgoing passengers using the exit next the body. Thus the leaving passengers have the more direct route, which facilitates unloading as, if the incoming crowd were particularly large both routes might be used for entrance, after the leaving passengers had cleared the passage. In addition, the incoming passengers, using the farther door, have practically the whole platform so that ordinarily all those desiring to get aboard may do so, the doors closed immediately and the fares collected from the passengers standing on the platform as the car makes its run to the next stop. The absence of bulkheads is another good feature



PREPAYMENT CARS FOR NORTHERN OHIO TRACTION. The large platforms which are provided the car are among its most important features, aiding as they do in the loading and unloading of passengers and consequently cutting down schedule times



PREPAYMENT CARS FOR NORTHERN OHIO TRACTION. The design of the car, with its large rear platform, makes it well adapted for loading large groups of passengers. This platform, which is under the control of the conductor, is divided by a pipe stanchion which extends from the floor to the roof in the center of the door opening. Thus, passengers who are near the rear door may leave by that route without wasting time in making their way to the front exit. The pipe stanchions keep the incoming and outgoing passengers well separated

of this platform arrangement, as it permits ample space for the passengers to pass in and out of the car without interfering with the conductor.

The interior of the car is finished in cherry, the trimmings, mouldings, etc., being of the "Sanitary" type—built so that there are no crevices or corners in which dust and dirt might collect. The windows are fitted with double sashes, the upper sash stationary and the lower arranged to drop.

The underframe of the car is built up of structural steel shapes, the side sills being made of a built-up girder in which the top member

is a 6-in. channel and plated on the outside with $\frac{1}{8}$ in. steel. This side sill extends from bumper to bumper on the outside, but terminates at the body corner posts on the side upon which the doors open. Steel angles are used to reinforce this side sill at each side post. The end sills are of 12-in. channels, fastened at each end to the 6-in. channel of the side sill. Center stringers of 3-in. channel are fastened together with a 10 by $\frac{3}{16}$ in. cover plate and these members are connected to the end sills, besides being riveted to the bolsters and cross members, which latter are of 4-in. channel.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

A PUBLICITY SERVICE

LAST month announcement was made on this page of a new service placed at the disposal of all companies in the electric railway field and offered without charge and with the distinct understanding that there be no obligation assumed by anyone making free and liberal use of it. This service is aimed at but one objective—aiding the electric railway manager, absolutely gratis, in placing his service before the eyes of the public in the proper light, in straightening out vexatious problems of policy toward the public, in procuring a proper relation between company and patron and in any of a thousand and one advertising difficulties that possibly may crop up. The services of the publicity staff of The J. G. Brill Company are offered without limit or restriction to the managers of the railway field—whether they be used in preparing a newspaper campaign, for or against a pending legislation, or in setting forth the true position of the company on any one of numberless problems, in advertising a park or any other special service of the company, in furthering a safety campaign or in any other way. Carefully assembled data and statistics gathered from scores of railways operating under a wide variation of conditions are at the disposal of the publicity staff of The J. G. Brill Company, and it is possible that to many managers knowledge of the results that have been obtained with various methods of operation on other roads may be of great value. Frequent use of this service is earnestly solicited. Perhaps here and there a few new ideas may be presented to the managers making use of it—ideas that may prove of value. Address the Publicity Department, The J. G. Brill Company, Philadelphia.

LOOK AHEAD

THERE is a type of man—fortunately he does not exist in large numbers—who completely befogs his own horizon. He's a pessimist by adoption; that is, he wasn't born that way, he wasn't meant to be a pessimist. But peculiar notions of what the world owes him in the way of a living, coupled with the failure of the world to hand him one boost after another, have discouraged him and warped his mental self so

that he has become a thing without ambition. This man's malady is infectious and the platform man is exposed to the contagion continually. "More pay, shorter hours," may meet with opposition, and promotions and raises in salary may seem entirely too scarce. The other fellow's job may look good to you, but it may be true that all the time you are coveting his position he is looking with lustful eyes at your own. Who knows? There is a dark side to every job, every profession, if you insist on wearing gloom glasses. There is a future for you right where you are, but what that future is to be may rest largely with you, how high you intend to go may depend almost entirely on you. Keep your neck strained looking up and ahead. There's where your future lies—ahead, where the goal for which you are striving is to be attained, and not behind, where failures and disappointments abound.

The platform man who has a temper and keeps it under control is deserving of a very large amount of praise. He faces a multitude of trying people with a multitude of trying dispositions during the course of his day's work, and if he brings his temper through unleashed he has averted probably a large number of angry arguments and possibly the same number of lost customers.

LORD MACAULAY AND ELECTRIC RAILWAYS

Of all the inventions, the alphabet and the printing press alone excepted, those inventions which abridge distance have done most for the civilization of our species. Every improvement in the means of locomotion benefits mankind morally and intellectually, as well as materially.

Thus Lord Macaulay, in his famous third chapter of his History of England, endeavored to bring his countrymen living in the nineteenth century a proper appreciation of the close relationship which exists between transportation and civilization. Could he but see the interurban electric railways of our modern day, charging across the continent at a—to him—unbelievable rate of speed and linking together communities which in his day would have been isolated by weeks of slow and tedious travelling, or could he see the ingenious and efficient electric railway operations—the tramways—of his own country, he would have been rewarded—and justly—with the unequalled feeling of having his beliefs, his theories, borne out by later events. What if he should step across the gap between the tortuous, slow method of locomotion of the early part of the nineteenth century and the high-speed, high-power automobiles, the

limited steam trains of today, the five-day transatlantic liners—or that crowning success of marine travel, the submersible freighter of recent weeks? Surely his amazement at the tremendous steps which we have made in transportation methods and facilities would be overcome by his realization of the step-for-step progress that has been made by our civilization. We of the present day need a contrasting example of this kind—a gasp of astonishment from the great minds of the past—every now and then in order that we may not lose sight of the strides we have made and are making and, more important still, in order that we may not become unappreciative. That perhaps is our greatest fault—tendency toward unappreciativeness. We are apt to become calloused to the progress that is being made around us; we are apt to forget the triumphs of yesterday in the victories of today. We need a jolt now and then to reawaken us, to stir our imagination, our initiative and, above all, to keep alive our appreciation. The lesson is catholic; it applies equally well to men in all walks of life. But why should it not apply particularly well to the men who are helping to make possible these great strides in transportation (and therefore civilization), the trainmen who form an indispensable part of the traction systems, the ocean lines, the steel railways? The men up above are full of appreciation of the value to the road of the service rendered by their motormen and conductors. Therefore, why should these motormen and conductors themselves look with anything but pleasure on their jobs, knowing the future that lies before them? They shouldn't. They are playing an important part in the world's progress and they will get their reward.

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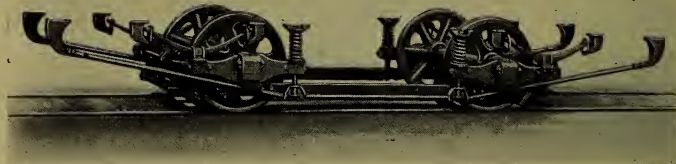
AUSTRALASIA—Noyes Brothers, Melbourne, Sidney, Dunedin, Brisbane, Perth

BELGIUM AND HOLLAND—C. Dubbelman, 48 Rue de Luxembourg, Brussels

ARGENTINE AND URUGUAY—C. S. Clarke & Co., Calle Bartolome Mitre 478, Buenos Aires

NATAL, TRANSVAAL AND ORANGE RIVER COLONY—Thomas Barlow & Sons, Durban, Natal

ITALY—Giovanni Checchetti, Piazza Sicilia 1, Milan

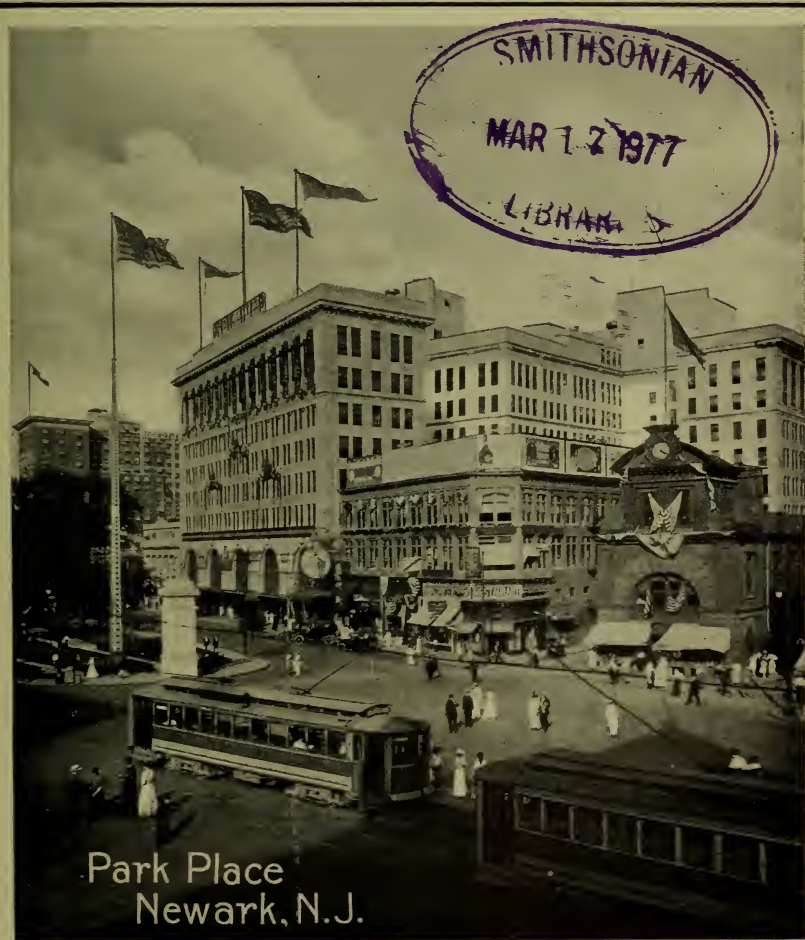


THE BRILL 74 TRUCK

THE Brill 74 Truck was designed primarily to provide the same easy-riding features as those given by the 21-E Truck but at greatly reduced weight. The truck has the happy advantage of being at once light enough for trailer service and strong enough for use with motors. Its chief distinguishing characteristic, aside from its lightness in weight, is the design of its journal boxes, which are cast with extensions to support a spiral spring at one end and a semi-elliptic, plate spring at the other. By casting a seat for the spiral spring at each end of the journal box and by providing an additional casting to fit into this seat to serve as the semi-elliptic spring seat, the journal boxes are made interchangeable. Channel steel end frames connect each pair of journal boxes together, and the boxes are kept in proper alignment by a bar at each side of the truck and attached to the boxes with bolts, which permit a desirable amount of flexibility and also provide for adjustment. The 74 Truck has won its place as a standard Brill truck under a wide range of service tests.

THE J. G. BRILL COMPANY, PHILADELPHIA

BRILL MAGAZINE



Park Place
Newark, N.J.



GEAR-DRIVE SNOW SWEEPERS

CLIMATIC conditions in the northern part of this country impose upon the snow-fighting apparatus of the electric railway lines severe service tests—so severe, in fact, that the apparatus must be just right in order that it may stand up under the grind. During the last three years much attention has been paid to the development of the Brill Gear-Drive Sweeper and the result is a sweeper that does the work and stands the racket. The advantages of the gear-driven sweeper over the sprocket-and-chain type are very apparent, especially when consideration is taken of the larger number of wearing parts and the consequent greater possibility of failure presented by the chain sweeper. Throughout, the gear-drive sweeper is built for good and constant service; the transmission arrangement is very similar to motor gearing, the gears being entirely enclosed and run in lubricant. The power for propulsion of the brooms is taken from a motor located at the center of the car, with a shaft extending horizontally at either side and terminating at either end with a bevel gear, from which a shaft extends to the broom shaft.



A stylized, handwritten signature in dark ink, likely belonging to the President of the Lake Shore Electric Railway Company. The signature is fluid and cursive, with a prominent initial 'S'.

PRESIDENT, LAKE SHORE ELECTRIC RAILWAY COMPANY

Leadership—the quality by the presence or absence of which a man's ability or failure successfully to mount high upon the ladder of life is largely tokened. Leadership—the infallible indication and the result of a strength of will, a magnetism of person, a definite, well-defined understanding of the things of Life as they are and as they should be, a balanced sense of right and wrong and safety and danger as the result of clear, logical thinking.

What is it in a man scarcely turned into his twenties, the young officer fresh from the theory of the classroom, raw from lack of experience, that can inspire men of twice his age, treble his experience, to follow him blindly into a danger that tears at their very throats? Leadership. Those men instinctively know that their young “leften’nt” would not knowingly plunge them into a danger from which they could not extricate themselves and, what is more important, that he would not hurl them into a hole into which he himself would not go. To be able to draw men blindly, trustingly, after you, even into the very clutches of gory-handed Death itself—that is Leadership.

And what a vast difference between the power to lead and the power to drive! Men led into a bad situation will fight tooth and nail, to the last ditch, for the man whom they followed there; men driven into a bad situation may turn to flee and, fleeing, trample underfoot their erstwhile driver. It does not need the scream of man-rending shells, of flesh-tearing bullets and bayonets, to set the scene for the truth which is pointed out by this comparison; the daily battle, the daily thrill, or the daily monotonous grind of Life continually points out the difference—the leader marching continually, steadily forward and the driver startling the world, first by his phenomenal advance and conquest of his obstacles and again by his inevitable and sudden plunge into abysmal oblivion.

To be a recognized leader—not a driver—is to be acclaimed a man of balance, magnetism, force and, above all, courage.

SEPTEMBER 15, 1916

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EDWARD W. MOORE

EDWARD W. MOORE, of Cleveland, Ohio, is a native of Ohio, having been born in that state, July 3, 1864. He was educated in the public schools and commenced his career with Everett, Weddell and Company, bankers, by whom he was employed during the years 1880-83. He was with the construction company that built the N. Y. C. & St. L. R. R. and later was employed in the treasury department of that company (1883-88). From 1888 to 1890 he was with the East End Savings and Banking Company. He was one of the organizers of the Dime Savings and Banking Company and its first Treasurer, 1891-99, being Vice-President from then until 1901. He was also one of the organizers of the Western Reserve Trust Company. He is President of The Lake Shore Electric Railway Company, Vice-President of The Detroit United Railway, President of The Cleveland, Painesville and Eastern Railroad Company, Vice-President of The Northern Ohio Traction and Light Company, and officer and director in numerous other electric railway companies in and around Cleveland, Toledo, and Detroit, being one of the organizers of these various companies. He is a member of Union, Country, Athletic, and Mayfield Clubs, Cleveland; Toledo Club, Toledo; Detroit Club, Detroit, Mich.; Metropolitan, Recess and Sleepy Hollow Clubs, New York City.

INTERURBAN CENTERS AND INTERURBAN CARS

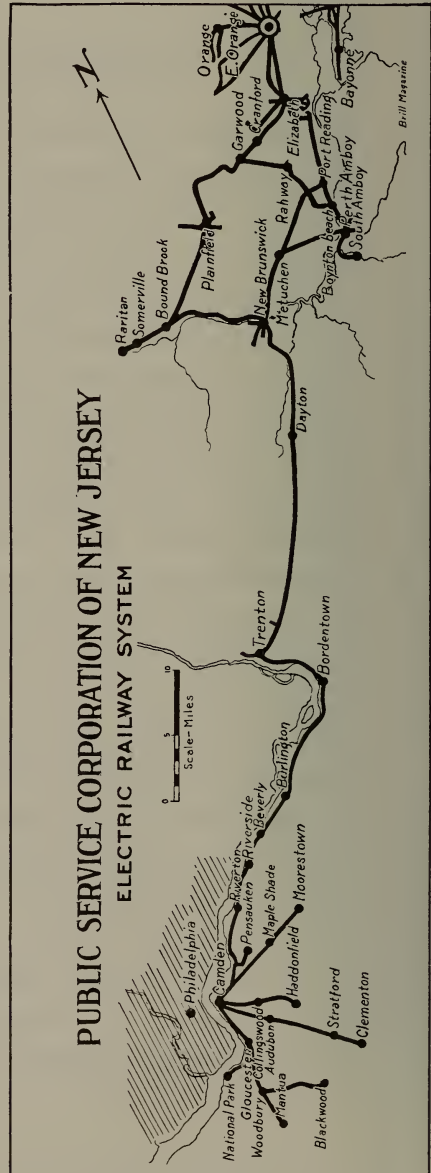
NEWARK, N. J.



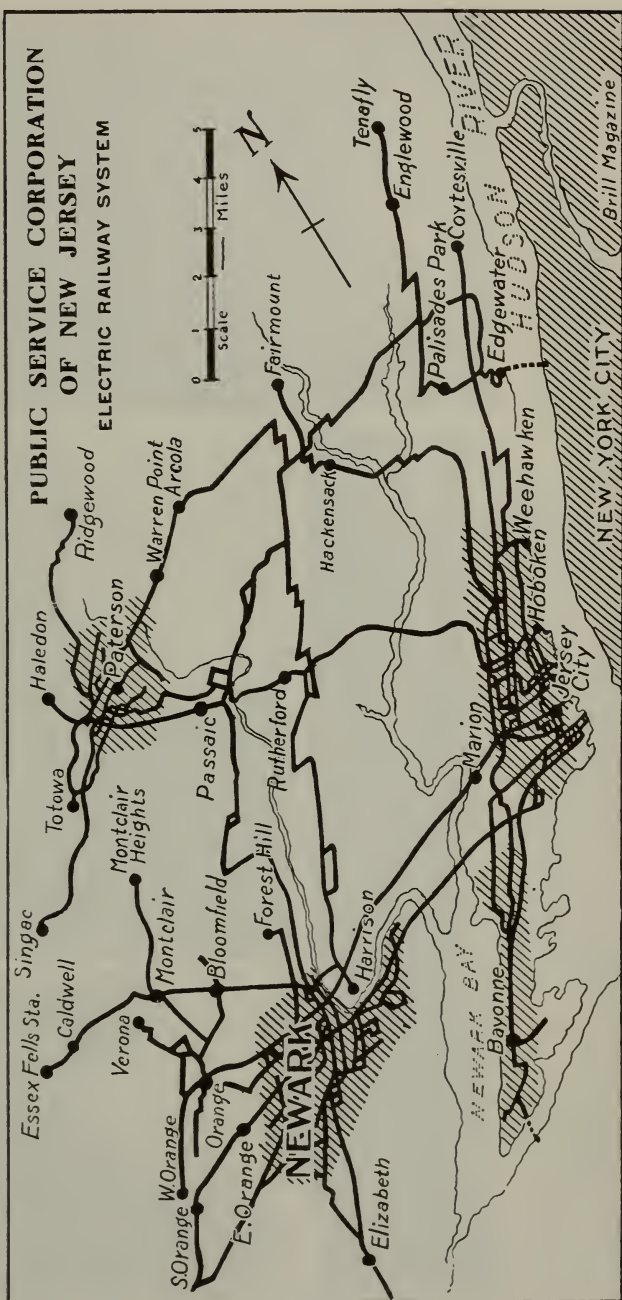
THE Public Service Railway lines, which are operated in New Jersey, form one of the largest and most progressive electric railway systems

in the country. The company's business, although confined within the boundaries of one of the smaller commonwealths, territorially speaking, is extensive and diversified, ranging in character from short-haul local traffic to long distance, high-speed service. The company operates 882 miles of tracks with an equipment of 2,200 cars and these serve a total population of upwards of 2,100,000, divided among 145 municipalities. Eleven of the twenty-one counties of the state are embraced within the system and in these eleven counties are located all of the more important cities and many towns which boast of large populations.

Newark is the heart of the system. Here the company has its home offices, housed in a splendid structure recently completed, which is at the same time the finest street railway terminal, and one of the largest office buildings exclusively devoted to public utility uses to be found anywhere. From



Newark the tracks of the company radiate in all directions, extending north and south a distance of about 125 miles, with local trackage systems in all the intervening populous communities. For operating convenience the system is split into six divisions, called the Essex, Hudson, Bergen, Passaic, Central and Southern, with a division superintendent in charge of each and all under the supervision of higher executive officers. Separate and apart from the divisional units, the company also operates high-speed service between Newark, Elizabeth, New Brunswick, Trenton and Camden, with a line between Newark and Perth Amboy. This interurban service is grouped under





TYPICAL TRAFFIC POINTS IN CITIES ON PUBLIC SERVICE LINES
1—Camden terminal at P. R. R. Ferries; 2—Newark Avenue, Jersey City, N. J.; Broad and E. Jersey Avenue, Elizabeth, N. J.; 4—Broad and Market Streets, Newark, N. J.

the name of the "Fast Line". In all, the company has 101 distinctive lines, or routes, and an idea of the amount of business done may be gleaned from traffic statistics for the year 1915, when the car miles totaled 51,873,660, the number of passengers carried exceeded 415,000,000 and the revenue was nearly \$17,000,000. The company also operates two ferries, one from Edgewater, N. J., to 130th Street, New York, and another between Bayonne and Staten Island.

Newark is the largest city in the state. It is located on Newark Bay, an arm of New York harbor, and the Passaic River gives it a shore line of ten and one-half miles, with a 20-foot channel, 300 feet wide. It is a port of entry and the city is developing terminal facilities at a cost of millions of dollars which will enable ocean-going steamships to dock at railroad terminals. The area of the city is only 23.40 square miles, of which 6.48 square miles is undeveloped meadow. The population within the city limits was 366,000 in 1915, but the adjacent communities which are tributary to Newark force the total population up close to the 700,000 mark. Newark is sometimes called the Industrial City, for it ranks eleventh among the cities of the country in manufactured products. It has 252 distinct branches of manufacture with 2,276 separate establishments using power and employing ten or more hands each. The value of its finished products in 1914 exceeded \$210,000,000, and it ranks first among the cities in

the value of high-grade jewelry and the largest variety and best quality leather produced. More than 75,000 persons are employed in its workshops. It has five trunk lines of railroads and the electric line of the Hudson and Manhattan Railroad with 226 trains daily to and from New York. It has unexcelled educational facilities, a gravity water supply drawn from the mountains twenty-five miles away and 660 acres of public parks.

Jersey City, the next largest city served by Public Service lines, is located on the west bank of the Hudson River, across from Manhattan Borough. It is the chief railroad terminal for New York Harbor and consequently one of the most important terminals in the East. Its population in 1915 was 270,000. North and South of Jersey City are other cities and towns, including Bayonne and Hoboken. These in the aggregate have as many people as Jersey City and Public Service serves them all.

Paterson is the third largest city in the state with a population of 125,000. It is noted as the center of the silk industry in the United States. Adjoining Paterson is the city of Passaic, a busy manufacturing center with a cosmopolitan population which has been doubling every decade and now boasts of 65,000 souls. Immediately to the south of Newark is Elizabeth, the "Rail and Harbor City", the first city along the route of the Fast Line. Elizabeth has a number of large industries and a population of 82,000. Next in order



INTERURBAN CENTERS AND CARS. Public Service Building in Elizabeth

along the Fast Line is New Brunswick, the site of Rutgers College and also a city of some industrial importance. It is located on the Raritan River about twenty miles from Newark and has a population exceeding 30,000. Perth Amboy lies southeast of New Brunswick on Raritan Bay. It is a port of entry and the home of a number of large industrial plants which support its 40,000 inhabitants.

Further along the Fast Line is Trenton, a city of upwards of 100,000 people and the capital of the state. It is located at the head of navigation on the Delaware River and lies thirty-three miles northeast of Philadelphia and sixty miles southwest of New York.

Trenton is noted for its potteries, producing more high-grade porcelains and china than any other city in the country. It also has a variety of other large and important industries, including rubber, motor cars, watches, and copper, iron and steel wire, rope and cables. Trenton can boast of having figured conspicuously in the early history of the country, especially in the Revolutionary War period. It was there Washington captured the Hessians and it was there that the Congress of the United States held its sessions in 1784.

Trenton is served by two steam roads and it also has interurban service from the lines of the New Jersey and Pennsylvania Traction



INTERESTING POINTS ON PUBLIC SERVICE LINES

- 1—Wallington, N. J.; 2—Grantwood Junction on Palisades, above Edgewater;
3—Main Street, Orange; 4—Bloomfield Avenue, Montclair; 5—Trestle from 15th
Street, Hoboken; 6—Milburn Avenue, near Maplewood

Company, the Trenton, Lawrenceville and Princeton Railroad and the Bucks County Interurban Railway, besides the Public Service lines. The major part of the city service is afforded by the Trenton and Mercer County Traction Corporation.

Between Trenton and Camden the Public Service lines run along the Delaware River, the scenery along the route being exceptionally attractive. Bordentown, Beverly, Delanco, Riverside, Riverton, Palmyra and Delair all are thriving communities through which the cars pass.

Camden may be said to be the southern terminus of the Public Service system. It is really the operating center of the Southern Division, for the company's cars extend to all the outlying cities and towns, extending for miles into Gloucester County. Camden is located on the Delaware River opposite Philadelphia and well may be classed as a suburb of the larger city, with which it is connected by several ferry lines. The city is an important manufacturing and shipbuilding center. It has many industries of national reputation, being the home of a certain well-known make of talking machines and a widely-advertised brand of soups, besides steel pens, chemicals, asbestos, oilcloth, morocco, woolen

goods and other commodities. The population of the city is about 100,000 and, together with its suburbs, it is showing a steady annual growth.

The erection of the splendid new terminal in Newark involved an immense amount of rerouting, changes in methods of operation and installation of extensive track connections, for which a total of twenty-nine franchises was obtained, these covering approximately ten miles of track and thirty special work layouts. The terminal building, with its subway approach and the new trackage, cost about \$6,000,000. The rerouting into the new terminal has unravelled one of the hardest traffic problems imaginable. Before the erection of the new building the corner of Broad and Market Streets, the business center of the city, had the reputation of being the second busiest traffic corner in the country. A total of 527 cars were scheduled to pass this corner every hour, or nearly nine cars per minute. This total, added to the vehicular and pedestrian travel, gives an idea of the congested condition of the corner. In short, this intersection had reached the saturation point and maintenance of the hour schedule seemed an impossibility. Records were taken and the average of efficiency was

TRAFFIC MOVEMENT AT BROAD AND MARKET STREETS, NEWARK, N. J.
DEC. 22, 1915, 6 A. M.-7 P. M.

Number of electric railway cars	3,719
Passengers carried	76,291
Pedestrians	153,435
Number of vehicles	16,892

Table showing reduction of congestion.

	Maximum Number of Car Move- ments Per Hour	
	Before Rerouting	After Rerouting
Broad and Market Streets	527	326
Market and Mulberry Streets	425	230
Broad Street and Central Avenue	392	276
Broad and Bridge Streets	352	236

found to be 9.52 per cent or 502 cars for the maximum hour. Thus it readily may be seen that the orderly movement of cars crossing the intersection was seriously interfered with. The figures at the bottom of page 264, determined by the traffic engineers of the company, are certainly very interesting and indicate more clearly than perhaps anything else might just what condition existed on a typical day before the opening of the new terminal.

With the opening of the new terminal a number of lines were directed away from this busy corner, the cars being led into the terminal by different routes. As a consequence the congestion was very materially reduced, not only at Broad and Market Streets, but at other heavy traffic points as well. The amount of this reduction is shown by the table at the top of the page.

The relief of congestion at Broad and Market Streets anticipates the development of this territory, in the opinion of the officials of the company, for at least a quarter of a century. Thus it may be seen that the new terminal

means much to the city, providing as it does for the future growth of Newark and its environs. The terminal building is located within 1000 feet of the Broad and Market Streets corner and in the heart of the business district, facing on Park Place and within a stone's throw of the Hudson and Manhattan Terminal. Cars coming into the terminal from the east are led in over an elevated structure; the cars of the Fast Line, connecting Newark and Camden, are in this class. The other cars, coming in from the west, use a subway. The ground floor of the terminal is absolutely clear of tracks and is used for a spacious concourse and for the showrooms of Public Service Gas Company and Public Service Electric Company, both of which, with Public Service Railway, are under the control of Pub-



INTERURBAN CENTERS AND CARS. Big Tree carhouse, Belleville



TYPICAL TRAFFIC POINTS IN CITIES ON PUBLIC SERVICE LINES
 Main and Market Streets, Paterson, N. J.
 Albany and George Streets, New Brunswick, N. J.
 State and Warren Streets, Trenton, N. J.
 Near Lincoln Park, Newark, N. J.



INTERURBAN CENTERS AND CARS. Elevated approach to Newark terminal

lic Service Corporation of New Jersey. Above the elevated train floor are six office floors, each covering an area of 30,000 square feet, which are used by the officers and employes of Public Service Corporation and its subsidiary companies.

The city of Newark is peculiar physically in that its limits are drawn in so close as to exclude the population of the surrounding territory, which otherwise would give it a population that would rank

it as the country's sixth largest city. To connect Newark with the surrounding cities Public Service Railway operates fourteen lines to and from the terminal. The ter-



INTERURBAN CENTERS AND CARS. Edgewater Ferry to 130th Street, New York



INTERURBAN CENTERS AND CARS. Public Service overhead crossing over tracks of Lehigh Valley R. R.

terminal thus may be seen to be a direct benefit to the people living beyond the limits of Newark as well as to the people of Newark itself, because it efficiently takes care of the traffic to and from these outlying points and prevents interference between this traffic and the local traffic. The terminal is thoroughly up-to-date in every respect, being protected by an interlocking signal system and by compressed-air switch operation.

The company's Fast Line faces a peculiarity of operation, due to the difference of track gauge, which is very interesting. Cars are operated from Newark to Trenton and return, stub-end operation being carried on in Trenton; the gauge of this trackage is 4 ft. 8½ in. From Camden cars are operated to Trenton and return, transferred to Newark being made in Trenton; the gauge of this line is 5 ft. At Camden the cars are

looped at the Pennsylvania Railroad ferry.

On the Fast Line the densest traffic is of course encountered in the cities of Newark, Elizabeth, New Brunswick, Trenton and Camden. Fare collection is by means of a city fare collection in the cities and through the interurban portions of the line, ticket and duplex fare receipts are used, covering the distance traversed. The speed attained on the various portions of the line varies. In the free-running sections outside of the cities the scheduled speed ranges from thirty-five to sixty miles per hour, varying with the number of stops. The changes of season affect the operation of this company to a very appreciable extent because of the attractiveness of the summer period for taking pleasure trips and also because of the increase of the travel to the seashore during the summer months.



INTERURBAN CENTERS AND CARS. Bridge over the Rahway River

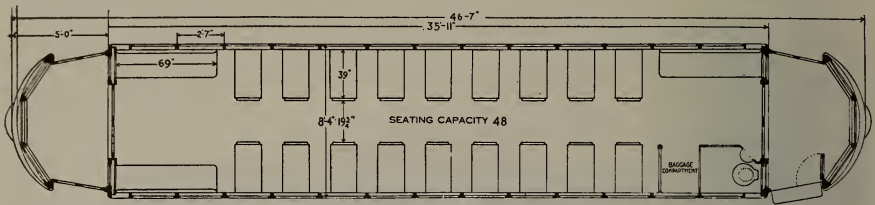
The character of the company's route makes its operation a most unusual one, a large percentage of the distance covered by the company being through cities, which require the observance of city rules of operation and city regulations and laws, therefore making it necessary for the company to have a type of equipment capable of meeting a widely diversified character of city and high-speed interurban service. Thus the cars in use by the company might almost be described as being of standard city type except for their saloons—present only on interurban cars—and their high-speed operation.

Between Newark and Trenton the line of the company is laid on private right-of-way, with the exception of the approaches to the cities and the stretches within the cities and between Camden and Trenton for a large part of the route it follows the highway. The major part of the roadbed is laid on single track, but double track

at present is being laid in some sections. The entire system is protected by block signals and the interurban section is under standard interurban rules involving the movement of trains by dispatchers' written train orders.

The company recently received from The Brill Company twenty cars which are of its standard type, except that steel enters more into their construction than was the case with the old equipment and that the new cars are more commodious than the old ones. These cars were ordered as a supplement for the old equipment of the company, to take care of the increased business. Ten of these new cars were built for service on the Fast Line between Newark and Trenton and of course have the shorter gauge. The other ten cars of the order were built for the wider gauge line between Trenton and Camden.

In addition to these twenty closed cars the company recently



INTERURBAN CENTERS AND CARS. Height from track to underside of side sills, 2 ft. 11 1/8 in.; height from underside of side sills over trolley boards, 8 ft. 5 1/8 in.; height from floor to center of headlining, 7 ft. 7 1/8 in.; track to step, 14 1/2 in.; step to platform, 13 1/2 in.; platform to floor, 10 1/2 in.; weight of carbody less electrical and air equipment, 19,150 lb.; weight of steel frame complete with sides, knees, bumpers, and bolsters, 6,500 lb.

put into service 127 new open cars, a fact which is full of interest in view of the apparent tendency of the electric railway field during the last few years to incline toward the belief that the day of the open car's adaptability to service conditions was past. This lot of cars is really the first large purchase of open cars in this country during the last four years, the last large order having been one for fifty cars of the Narragansett type built for the Washington Railway and Electric Railway Company by The Brill Company in 1912 and described in BRILL MAGAZINE for July of that year. The addition of these open cars to the equipment

of the Public Service Railway consequently is of importance, indicating as it does the revival of interest in the subject of open-car equipment. The equipment of the Public Service Railway always has included a certain number of open cars and the purchase of such a large supplementary equipment shows the results obtained from operation with the type have proved its entire adaptability.

The closed cars are built on underframes in which the side sills are of 5 in. angle with the long leg laid horizontal, this sill being reinforced at the bolster with a 6 in. angle. The end sills and crossings are of pressed steel, the former



INTERURBAN CENTERS AND CARS. These cars, twenty in number, are divided into two groups of ten each, one group (built with saloons) being for use on the Fast Line of the company between Newark and Trenton and the other being used on the Riverside Division, running from Trenton to Camden

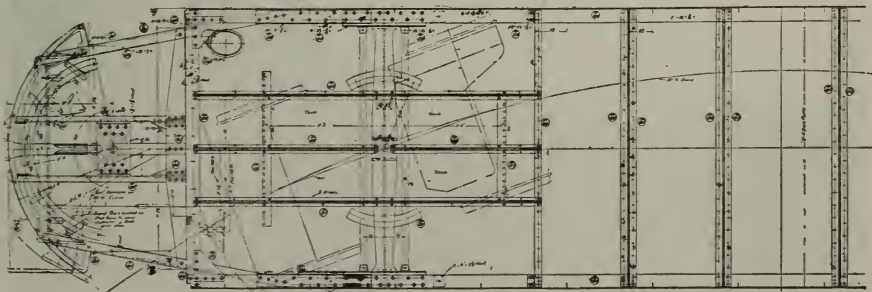


INTERURBAN CENTERS AND CARS. Due to the difference of the gauge (that of the track between Newark and Trenton being 4 ft. 8½ in. and that of the Riverside Division 5 ft.) these new cars are of course not interchangeable. The green cars are operated from Newark to Trenton, where the terminal is of the blind-end type, and the yellow cars are operated from the same point in Trenton, where there is a parallel terminal track, to Camden, of course necessitating transfer of passengers at Trenton

3-16 in. and the latter 1/8 in. thick. The bolsters are of cast steel and are bolted to the side sills and the angles reinforcing the side sills. The outside platform knees are of 7 by 3½ in. angle reinforced under

the end sill with a 2 by 2 in. angle and the center platform knees are of 4 in. channel extending between the end sills and the bumper channels.

The platforms are enclosed with



INTERURBAN CENTERS AND CARS. The underframes upon which these cars were built, are of steel, the bolsters of cast steel. Tees are used for the side post. The construction is interesting, because of the absence of diagonal crossings

round-end vestibules sheathed with sheet steel both inside and out. The vestibule doors are of the Brill folding type made in two sections and the carbody is separated from the vestibule by a bulkhead in which independently double sliding doors, opening 40 in. and glazed in the upper panels, are built. There are thirteen windows on each side of the car, the heads straight and the sashes double, the lower sash arranged to raise vertically.

Brill "Winner" Seats were specified by the railway company, along with Brill "Dedenda" gongs and Brill patented signal bells. The location of the seats differs in the two types of cars, the green cars (built for operation between Newark and Trenton) being provided with a toilet and a baggage compartment, which necessitated



These new open cars are also built on steel underframes. One of their interesting features is the double step

doing away with the longitudinal seat in one corner of the car. Thus the yellow cars (built for the Riverside Division—between Camden and Trenton) have a seating capacity of 52, a total which is greater by four than that of the other ten cars.

In the body framing the corner posts are of ash and the side posts are of $1\frac{1}{2}$ by 2 by 3-16 to $\frac{1}{4}$ in. tees extending from the underside of the side sill to the top rail.



INTERURBAN CENTERS AND CARS. One of the company's new open cars, photographed before the Hilton carhouse, in Hilton, N. J.

ONE-MAN CARS FOR SEDALIA, MO.

BRILL 21-E TRUCKS

YET another instance of the entire feasibility of the one-man method of operation for street railway lines in towns up to 50,000 population (in many cases it is feasible in even larger cities) has been shown in the purchase

dalia Company faces a rather difficult problem, solution of the economic side of which has been effected largely by the adoption of the one-man method of operation. It was found that in a town the size of Sedalia there was a very



ONE-MAN CAR FOR SEDALIA, MO. These cars effect a very appreciable saving in cost of operation, weighing but 13,085 pounds as against 38,000 and 26,000 pounds respectively for the double- and single-truck equipment formerly in use. In addition, they will cut down maintenance costs and, because of the more frequent schedule they will make possible, will increase public favor and consequently boost the net revenue of the company

from the American Car Company of eight one-man, single-truck cars by the City Light and Traction Company, of Sedalia, Missouri. Operating in a town of 20,000, whose population is located within a comparatively small area, thereby robbing the company of absolute dependence upon its service on the part of its patrons—walking from one point to another being entirely possible—the Se-

much larger demand for traffic in the hot summer months than during the cold days of winter. The officials of the company found that riding in the summer had become very popular as a source of amusement or as a means of cooling off and getting fresh air on hot, sticky days and nights—especially the latter. It was found early in the company's experience that even the most stormy days of winter

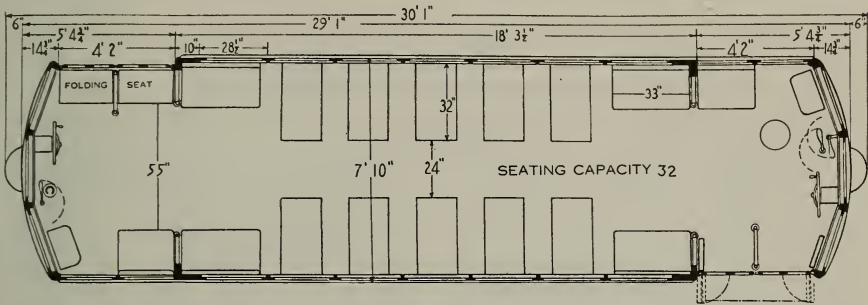
failed to drive as many citizens on board the cars of the company, due to the walking condition or the state of weather overhead, as did the hot, depressing days of summer, which make the public seek a breath of cool air. Hence, the operation of the company was designed to appeal to people desiring a cool, refreshing ride. The town, however, is growing rapidly and the outlying districts are filling up with new houses and new people, which before very long will change the nature of the company's lines, as far as the viewpoint of the public is concerned,

from a pleasure operation to an undeniable necessity.

In November, 1915, the company decided to try out the one-man method of operation and accordingly the rear end of the old cars was closed up and the operation was changed from far to near-side stops. This old equipment, originally designed for double-end operation on a single-track line, made it necessary to load on the left-hand side. Also it left unprotected, on most of the cars, a stationary step at the rear, despite the fact that the rear door had been closed. These old cars had



ONE-MAN CARS FOR SEDALIA, MO. The experimentation which led to the purchase of these eight one-man cars in Sedalia, a typical town of 20,000, has borne out in every detail the claims that have been made as regards the adaptability of the one-man operation to the majority of cities and towns with a population of less than 50,000 inhabitants



ONE-MAN CARS FOR SEDALIA, Mo. Height from track to underside of side sills, 21 $\frac{1}{8}$ in.; height from underside of side sills over trolley boards, 8 ft. 5 $\frac{1}{2}$ in.; height from floor to center of headlining, 7 ft. 8 $\frac{1}{8}$ in.; weight of carbody, 5500 lb.; weight of electrical equipment, 2400 lb.; weight of airbrake equipment, 800 lb.; weight of trucks complete, 4385 lb.; total weight, 13,085 lb.

the drop vestibule, making a step-up necessary to get into the car and, as an additional handicap, no doors were provided the vestibules to protect the passengers on the platform, the idea of the company being to go to as little expense as possible until it had been ascertained that the one-man operation would prove successful. It did not take long to convince the company of the entire practicability of one-man operation and so plans were laid for a new equipment (photographs of which are shown herewith) which best would handle the situation, the company being especially desirous of eliminating delays so that the cars operated under one-man crews would have every opportunity to make as good time as any other car—or the same car—manned by two men. The new cars load the passengers on the right-hand side, all are on the level and the automatic doors, which facilitate “getting away” as soon as the car is loaded, and the ample platform room, which makes it possible for the car to be loaded and unloaded at the same time,

all serve to make the new cars a radical change in type from the equipment formerly in service and a vast improvement over it. The new cars, immediately upon receipt, were impressed into service, making a complete replacement of the equipment in regular service, some of which will have the platforms remodeled and be held in readiness for relief or extra-duty work.

Another decided advantage of the new type of equipment over the old lies in the weight. All of the old cars were extremely heavy, five of them being 38,000 pounds each and three of them 26,000 pounds each. These old cars, it was found, formed a great drain on power, as well as being hard on the track, which in a small town is hard to keep in the very best of condition, due to the amount of money necessary in paved streets. The new cars, weighing 13,085 pounds, are a little less than three times as light as the heaviest of the old equipment and exactly twice as light as the lightest of the old cars. That their use

will effect a very large saving in power consumption and maintenance of track is apparent. In addition, by means of additional schedules, the company will induce more riding because with the lighter cars and one-man operation it can give more frequent service and at no additional expense, at the same time increasing the gross receipts by means of increased favor and conse-

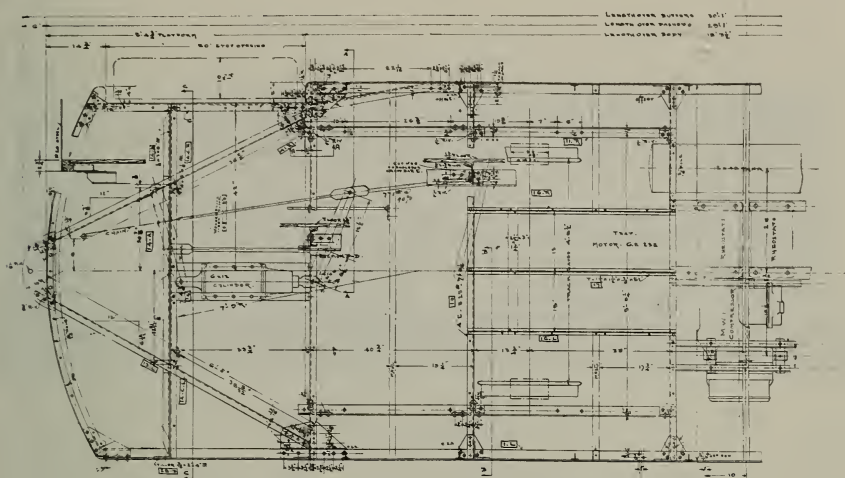
quently increasing the net income.

Mounted on smooth, easy-riding Brill 21-E Trucks the new cars will prove just as comfortable as did any of the old equipment, which included a few double-truck cars. The wheelbase of the particular truck selected for these cars was 9 ft., whereas the longest wheelbase of any of the old trucks was 7 ft. 6 in. This increase in wheelbase length speaks eloquently of the increase in comfort of riding afforded by the new cars.

Sedalia is located almost in the geographical center of the state of Missouri, 96 miles from Kansas City and 188 miles from St. Louis. The lines of the company form a rough letter "H", the cross-bar of which is Ohio Street, the main street. One leg of the "H" begins in a loop at the Missouri State Fair Grounds and extends past the M. K. & T. shops, which employ 800 men, passes a school and turns into Ohio Street, looping around a business block in the center of the shopping district. The upper half of this leg of the "H" begins at a school, passes a playground, and turns at right an-



ONE-MAN CARS FOR SEDALIA, Mo. The company faces a trying situation in that the town as yet scarcely has grown to a point where transportation facilities are an absolute necessity. However, its outlying districts are filling up rapidly and soon the line will change from one which is used mostly for pleasure purposes to an operation which is an undeniable necessity.



ONE-MAN CARS FOR SEDALIA, Mo. The company experimented for a time with re-modeled equipment, which, however, had the disadvantage of loading at the left side and of a step-up from the platform to the car floor. The new cars load on the right side and the platform floor is on a level with the floor of the car

gles into Ohio Street, looping as does the first line. The school end of this line, as is also the case with the other line of the company (the other leg of the "H"), is a dead-end and so the changing of trolley, fare-box and fenders is necessary. The other line forms the other leg of the "H," beginning at a dead-end terminus at the City Park on the west, running through the center of the town past the library, the M. K. & T. depot, roundhouse and hospital and a school and terminating in a dead-end at the Missouri Pacific Shops, where 1,500 men are employed. Thus all the lines of the company pass one corner (Third and Ohio Streets).

The State Fair Grounds is a large affair, the state having invested about a half-million dollars in modern buildings. During one week of the State Fair about 75,000 passengers are handled by the

street car company. The company co-operates in every possible way at the City Park and the State Fair Grounds, contributing generously each year to a fund which is made up to furnish band concerts at the park, which concerts are, however, readily accessible by foot passengers as well as automobiles, which class of patrons, the officials say, form the majority of the crowd. The average speed which the company is able to maintain, including stops, is nine miles per hour.

The company furnishes its own power, and also operates an Electric Department. Tickets at the rate of six for twenty-five cents are sold, and these are also put up in \$2.50 and \$5.00 books. The company also sells half-fare tickets, ten for twenty-five cents. Transfer privileges likewise are extended to the patrons of the lines.

In the underframes side sills of $2\frac{1}{2}$ in. angle, extending continuously the full length of the car-body in one piece, are used. The cross sills are of 4 in. channel, riveted to the side sills and truck sills with gusset plates and at the corner posts they are reinforced to carry the platform knees. The dasher angles are of $1\frac{1}{2}$ in. steel, fastened to the side sills with gusset plates and the center sills at the ends are of 3 in. channel fastened to the cross sill and the dasher angles with gusset plates. These sills extend 6 in. beyond the dasher and, by means of a 3-16 in. plate riveted top and bottom, form a drawbar pocket. The platform knees are of 6 in. channel fastened to the side sills, cross sills and dashers; these knees are set in five inches from the side of the car.

The corner posts are $1\frac{1}{4}$ by $1\frac{1}{4}$ by $\frac{1}{8}$ in. angle iron in one continuous piece, extending from side sill to side sill and riveted to each. The side posts are of $1\frac{1}{2}$ by $1\frac{1}{2}$ by 3-16 in. tees, also extending from side sill to side sill. The letterboard is of sheet steel and is bent over the top sash so as to form the drip rail.

The top sash is made in one continuous piece extending from corner post to corner post and painted at each post so that the upper sash is made to look like individual sash. The lower sash is arranged to raise and, besides the windows in the body of the car, there are two raised sashes on the closed side of the platform, each of the same type and style as the body side sash. The platforms are built on

the same plane as the floor of the car and have door openings at the diagonal corners of the car, to the right of the motorman. The doors, built in four parts, swing out. The front sashes drop into pockets, the center sash being arranged so as to be easily adjusted at any height by the motorman. Folding steps operate in unison with the door mechanism.

Brill "Winner" Seats were used in the car, five cross and longitudinal seats on each side of the aisle. The seats and backs are of cherry slats. Also there is a stationary slat seat on the closed side of each platform, at the diagonal corners, as well as a folding slat seat divided into two sections, one folding against the pipe bulkhead stanchion and the other against the inside of the vestibule on each platform at the opening. Thus the seating capacity of the car is increased.

The use of the Brill 21-E Truck under the car, is one of the strongest points in its favor. For a comparatively long length of time, the 21-E has remained unchanged in the fundamentals of design, a fact which shows its perfection. Wide-wing journal boxes, recently added to the truck, are advantageous but not necessarily essential. The truck has stood up under all sorts of service tests, and has gained a well-merited "place in the sun" of the electric railway field. Brill "Half-ball" Brake Hangers are also incorporated in the design of the truck and play an important part in furnishing the smooth-riding qualities.



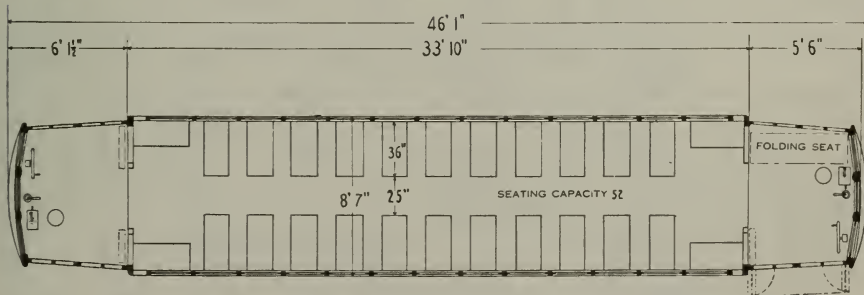
SEMI-CONVERTIBLE CARS FOR READING. These cars are similar in design to those of an order built for the Reading Company in 1912 and described in Brill Magazine for August, 1912

SEMI-CONVERTIBLE CARS FOR READING

BRILL 27-M.C.B. TRUCKS

THE Reading Transit and Light Company, of Reading, Pa., a utilities company controlled by the Eastern Power and Light Corporation and operating 172 miles of city and interurban track with a total of about 300 cars, has received from The J. G. Brill Company fifteen 34-ft. cars of the Semi-Convertible Prepay-

ment vestibule type, which are very similar to a previous order built for the company and described in BRILL MAGAZINE for August, 1912. The cars are mounted on high-speed trucks—the Brill 27-M. C. B.—and are to be used on the suburban lines of the company. The previous order comprised ten city cars, mounted on Brill 39-E



SEMI-CONVERTIBLE CARS FOR READING. Height from track to under side of side sills, 2 ft. 10½ in.; height from under side of side sills over trolley boards, 9 ft. 0½ in.; height from floor to center of headlining, 7 ft. 6½ in.; track to step, 15½ in.; step to platform, 14½ in.; platform to floor, 9 in.; weight of carbody less electrical equipment, 22,557 lb.; weight of electrical equipment, 1200 lb.; weight of airbrake equipment, 993 lb.; weight of trucks, 15,210 lb.; weight of motors, 7600 lb.; total weight, 47,560 lb.

Trucks, and ten suburban cars, very similar in design to these fifteen new cars and mounted also on Brill 27-M. C. B. Trucks.

The platforms of the cars are arranged in the usual manner of Prepayment cars, each door opening being enclosed with four-part folding doors in two sections, one section folding against the vestibule corner post and the other section against the body corner post. These doors are operated in unison with a folding step, the controls being in the usual position, the motorman's control stand between the controller and the engineer's valve and the conductor's control located at the center of the end sill at each end of the car. Round-end vestibules are used to enclose the platforms, the vestibules being sheathed on both the outside and inside below the windows with sheet steel. Three windows with single sash to drop, the center sash being adjustable at any height, are provided in each vestibule.

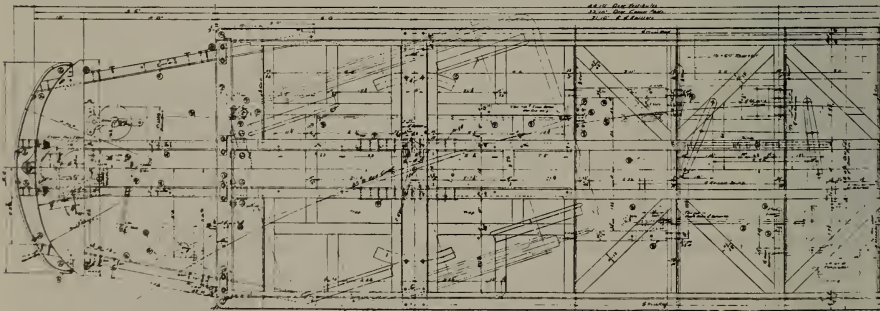
In the underframes, the side sills are of 4 by 7 $\frac{3}{4}$ in. yellow

pine, plated the full length of the body with a $\frac{3}{8}$ by 15 in. steel plate. The end sills are of oak, 5 $\frac{1}{4}$ by 6 $\frac{7}{8}$ in., and the needle beams are also of oak, 4 $\frac{1}{2}$ by 5 $\frac{1}{2}$ in., and the diagonal braces are of oak, 2 $\frac{3}{4}$ by 4 $\frac{1}{2}$ in. Both outside and inside platform knees are of oak, 3 in. thick. The crown pieces are of oak, 2 $\frac{1}{4}$ by 18 in. The bolsters are cast, with a top plate of $\frac{3}{4}$ by 9 in. wrought iron and a bottom plate of $\frac{7}{8}$ by 9 in. steel.

The floor of the car, laid with 13-16 in. yellow pine boards, is ramped three inches. The aisles and the platforms are provided with maple floor strips and the car is built with raised side floors. Trapdoors in the floor make the motors readily accessible.

The roof is of the Brill Plain Arch Type, extending the full length of the car and strengthened with concealed steel rafters, forged in one piece to the shape of the roof and bolted to the top rail on each side of the car. The roof, as is usual, is built of poplar boards covered with cotton duck.

Brill "Winner" seats are used



SEMI-CONVERTIBLE CARS FOR READING. The usual method of prepayment platform arrangement is embodied in the design of these cars, doors and steps operating in unison, the front platform under control of the motorman and the rear platform under the conductor's control



SEMI-CONVERTIBLE CARS FOR READING. Brill 27-M.C.B. Trucks are used under these cars, which are to be used for suburban service, at fairly high speeds

in the cars, eleven transverse seats with reversible cushions and backs on each side of the car and at each end, there is a longitudinal seat to accommodate two persons. The cushions and backs are covered with rattan. At each platform door on each side of the platform there is a collapsible seat of wood which is arranged so that it can be used when the doors are not in operation and folded up out of the way of passengers when the doors are being used. Also, the motor-man is provided with a collapsible seat.

A Brill Patented "Dumpit" Sandbox is placed in each diagonal corner of the car, operated by pedals on the platforms. The

windows, of which there are thirteen on each side of the car, are of the Brill Semi-Convertible type, both sashes arranged to raise, the lower one being hinged to the upper one. The upper side of every other window on each side of the car is fitted with a small sash which can be tilted in to the interior of the car so as to provide more ventilation. This arrangement was perfected first for the Philadelphia Rapid Transit Company, of Philadelphia, and has proved satisfactory.

Three 20-ft. city cars, mounted on Brill 21-E Trucks, also are being built for the Reading Company and will be described in a later issue of BRILL MAGAZINE.

INTERURBAN CARS FOR DETROIT UNITED

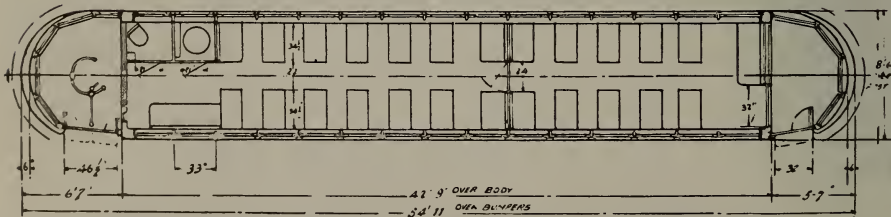
MOTOR AND TRAILER TYPES

A RECENT order of cars built by the G. C. Kuhlman Car Company, of Cleveland, Ohio, was one for eight motor and eight trail cars, both types designed for interurban service on the lines of the Detroit United Railway. In addition to these sixteen cars, which are shown in the accompanying illustrations, the Detroit United recently has received from the Kuhlman Company fifty center-entrance trailers of the same type as the order described in an article published in BRILL MAGAZINE for

February of this year. The exterior view of this center-entrance car, together with its seating plan, will be found on page 47 and its interior view is illustrated on the following page. On page 46 appears the exterior view and seating plan of the standard Detroit United car, built under a previous order. This car, a leading feature of which is the "Detroit platform", may be seen to be very similar in appearance to the new interurban cars described herewith, the differences between the two



INTERURBAN CARS FOR DETROIT UNITED. These cars are very similar in general appearance to the standard city type of car in use by the company. A few slight changes aside from the seating plan, however, have been made, including truss rods under the car and a slightly different front platform arrangement.



INTERURBAN CARS FOR DETROIT UNITED. Height from track to underside of side sills, with capacity load, $34\frac{1}{2}$ in.; height from track to under side of sills, light, $38\frac{1}{2}$ in.; height from track to floor, 44 in.; height from rail to bolster, light, $32\frac{1}{2}$ in.; loaded, $28\frac{1}{2}$ in.; truck centers, 29 ft. 9 in.; weight of carbody, including heaters, seats, etc., 26,600 lb.



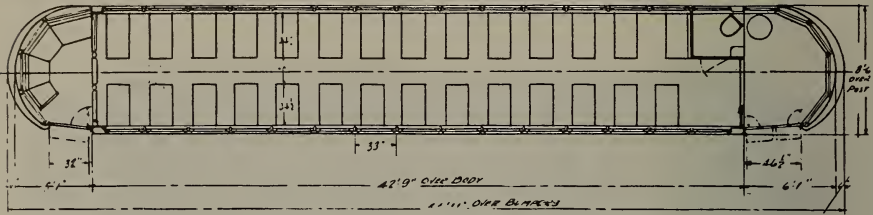
INTERURBAN CARS FOR DETROIT UNITED. The two folding doors of the rear platform serve as exit and entrance doors, the front door serving as an auxiliary exit. Pipe railings serve to keep the streams of outgoing and incoming passengers apart.

types being very slight and consisting in the main in the shape and arrangement of the front platform and in the truss-rods which have been added in the new cars.

Of course, being designed for interurban service, these new cars are equipped with toilets and water coolers, a feature which was unnecessary in the other order, exclusively a city type. Also, the motor cars are partitioned into two compartments, a smoking compartment to accommodate 23 persons, and a general passenger compartment whose capacity is 31. With the exception of the stationary cross seats placed against the partition between the two compartments, the stationary cross seat against the front bulkhead in the smoking compartment (seating three persons) and the longitudinal seats (seating three persons) across the aisle from the saloon in the main passenger compartment, the seats are of the transverse, reversible type, those in the smoking compartment upholstered in leather and those in the main compartment in plush. The seats in the trail cars also are upholstered in plush.

The safety idea is well carried out in these cars, "Safety First" signs being placed in conspicuous positions on the inside of the corner post and on the post of the partitioning bulkhead. The car is lighted from the center of the ceiling, sockets for cluster lights being aligned down the center. Baggage racks are installed on both sides of each compartment, an important feature of the car, when the interurban service for which it will be used is taken into consideration. The fare-register rod is carried over to the right-hand side of the car, facing front, so as to leave the center of the overhead space clear for the signalcord.

Window guards are provided with the cars, a feature which was not a part of the design of the previous order referred to—the car shown in February. The rear platform is arranged so that the two folding doors serve as entrance and exit, the front door, also an exit, serving as an auxiliary to the rear exit. Pipe railings are installed so as to separate the conductor from his passengers and these railings serve to keep the in-



INTERURBAN CARS FOR DETROIT UNITED. Height from track to under side of side sills, with capacity load, 34 1/2 in.; height from track to under side of side sills, with car light, 38 1/2 in.; height from bolster to rail, 32 1/2 in.; light, 28 1/2 in., loaded; rail to center of drawbar, 13 1/2 in.; truck centers, 29 ft. 9 in.; weight of car-body, including heaters, seats, etc., 25,960 lb.

coming and outgoing streams apart. In the trailer, of course, the door arrangement is just opposite to that of the motor car, the double doors being built at the front so that when the car is used for train service these doors are at the center of the train and

therefore well placed for rapid loading, the passengers boarding the train at one point, some going into the front car and the others choosing the trail car. As in the motor car, there is an auxiliary exit door, which door, in the trailer, is located at the rear.



INTERURBAN CARS FOR DETROIT UNITED. The cars are divided into main passenger and smoking compartments, a good feature for the interurban service in which they will be used, and they are provided with toilets, also a good interurban feature.



THIRTY CENTER-ENTRANCE CARS FOR BOSTON ELEVATED

BRILL 53-F TRUCKS

THE Boston Elevated Railway Company is receiving from The Brill Company thirty 48 ft. 2½ in. center-entrance trail cars, duplicates of the 75 cars built for the company in 1915 and described in BRILL MAGAZINE for May, 1915. The cars are mounted on Brill 53-F special diamond truss frame trucks with a 5-ft. wheelbase and 24-in. wheels.

Strain at the low center-entrance doors is greatly reduced by the position of the trucks, each half of the car being well balanced on its respective truck and therefore taking much of the load off the dropped center section. The door arrangement at this center entrance is one of the most interesting features of the car. Double sliding doors are hung outside of the car, conforming to the inclined shape of the sides. These doors are suspended from an overhead track and are provided with guides

and rollers at the bottom. The doors are operated pneumatically, with the engine fixed directly overhead just below the side sign and the handles controlling the operation are located in the center of the platform, a removable railing extending to a center pipe station in the doorway at each side.

Side plates of 3-32 in. thickness are riveted to continuous angle sills which are depressed eighteen inches to allow for the low platform at the center of the car. The top of the plates is reinforced with a 3 by 1½ in. bar and light angles which serve as seat supports, at the same time adding stiffness. The wide leg of the angle sills is placed horizontally.

The side posts are inclined inwardly four inches on each side, thus allowing for clearance in the subways. The top plates are of angle iron, and the roof carlines are mortised into a furring strip.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

THE BRILL PUBLICITY SERVICE

REALIZATION of the tremendous importance of fostering public favor so as to hold and increase patronage and of the publicity shortcuts that may be taken to this end no doubt has been borne in upon practically every electric railway manager; the advantages of advertising are too well known for this to be otherwise. However, it has seemed possible to The Brill Company (and experience is bearing out the conviction as a true one) that there are many managers who are finding it difficult to devote the proper amount of their own time to publicity work and who would be aided materially by suggestions resulting from a careful study of traffic data and statistics gathered over a long period of time from a wide variety of operations. To these managers the new free advertising service offered by the publicity staff of The Brill Company should make an appeal. There is absolutely no indebtedness involved by a manager who asks for advice or assistance in connection with his advertising problems; the service is open to all friends of The Brill Company, and that means to every man or company operating a railway, no matter whether a customer of The Brill Company or its subsidiary plants or not. Managers in various cities and towns already have availed themselves of the offer and every effort is being made by the Brill publicity staff to aid them. Whether it be a campaign against a piece of unfair legislation or a hindering traffic rule, whether it be a park campaign or whether it be something in connection with a publication such as a bulletin or folder or house organ, requests for help always will be gladly received and given prompt attention.

“TWO wrongs never can make a right.” Just because a passenger engaged in thought or through sheer negligence fails to push the signal bell is no excuse for the motorman’s acting grouchy about opening the door or reminding the passenger, in angry tones, of what he should have done. Politeness is *always* in demand, and it should be the aim of each motorman and conductor to send *every* passenger away a pleased customer.

AN ADVERTISING HINT

THROUGH observation of a large number of railway operations, with a view to ascertaining the results obtained with their respective campaigns of advertising, it has been borne in strongly upon us that there are a considerable number of cases where electric railways are apparently laying too much stress, and consequently spending too much money—proportionately speaking—upon the bulletin, pamphlet, house organ form of advertising, to the exclusion of newspaper and, what is even more important, car-card advertising. In almost every case a well-written, attractively-presented newspaper advertisement is full of possibilities. The newspaper is the obvious direct medium of advertising; it goes into the home—and into how many homes it goes the advertiser knows to the last figure from the sworn circulation statement of the management of the paper—a statement protected by law. The newspaper is the natural place for the citizen to look for news of the happenings of his town or city, it is the place in which the public expects to find everything that concerns it either as individuals or as a body, and therefore it is the logical place for a utility with a message to place that message, in order that it may “get across.” Then, too, aside from the very obvious direct advantage of advertising in newspapers, is the advantage of cementing to the company and its service that public favor which is so necessary for continued prosperity. And this may be accomplished in no better way than in cementing to the operation the favor of the local press, which after all is but the public brain, to a very large extent. The columns of a newspaper with which advertising is judiciously placed may be pried open to publicity work of all sorts on the part of the railway company and every line, every mention of the service of the company, inserted into the columns of the public press means just so much better understanding between the public and the utility and so much greater favor on the part of the former for the latter. Then, too, there is the matter of car-card advertising, which should not be passed over lightly. Many companies no doubt have overlooked the very great value to them that a properly-displayed card would be. A brief, concise, snappy statement of fact, thrown forcefully but attractively into the public eye through the medium of the car-card, cannot help but reap a harvest of good results. The fact that the advertising racks of the street railway cars are filled to their capacity from one end of the year to the other would indicate that the advertisers using the medium are well satisfied with the results obtained and therefore it would seem a very good, far-sighted policy on the part of the company to utilize one of the spaces in its own cars to place before the public in the proper light its own service.

MR. THOMAS N. McCARTER, president of the Public Service Corporation of New Jersey, in a recent address delivered at Newark, N. J., before a joint meeting of the Company Sections of Railway, Gas and Electric Companies, upon the opening of the Public Service Terminal, said, in part, the following:

A study of the improvement of transportation facilities of this country and in this vicinity develops a curious and troublesome fact—the more such facilities are improved the more insistent the demand becomes for still greater improvement. In a word, the demand for better means of passage from place to place increases by efforts to comply with it and no matter how successful those efforts may be the demand for still better means becomes constantly louder. Cars have been increased in size and run rapidly and in trains, but the straphangers increase in number year after year and are constantly heard from. To keep pace with their demands seems to be beyond the power even of the wonder-working engineers of our time.

What a note of optimism for the motormen and conductors (and other employes) of the electric railway companies! The prediction that the electric railway business by no means has reached its zenith but is to continue its astoundingly rapid progress—such a prediction, made with the authority which Mr. McCarter's position lends it, surely must instil into motormen and conductors a great feeling of optimism. The business with which they are connected is growing and it is going to continue to grow, and the men who grow up with it will reap the harvest. Improvements are to continue to be made, salaries will increase and better positions open up for those who deserve them. And the ones who will be considered deserving of those advancements are the men who work conscientiously and earnestly day by day to do their share in helping the progress of the road.

Success rarely hounds the footsteps of the brag, the big-head, the bumptious. "Chucking a bluff" seems to be the most natural occupation of some men, but take it as truth that it is many million miles from being the most profitable.

CHANGES OF ADDRESS

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



THE J.G. BRILL COMPANY

Main Office

PHILADELPHIA, U. S. A.

CABLE ADDRESS: "BRILL," PHILADELPHIA

London Office: 110 Cannon Street, E. C.

CABLE ADDRESS: "AXLES," LONDON

AMERICAN CAR COMPANY, ST. LOUIS, MO.

G.C. KUHLMAN CAR CO., CLEVELAND, OHIO

JOHN STEPHENSON CO., ELIZABETH, N. J.

WASON MANFG. CO., SPRINGFIELD, MASS.

CIE. J. G. BRILL, 49 RUE DES MATHURINS, PARIS

CABLE ADDRESS: "BOGIBRIL"

Agencies

AUSTRALASIA—Noyes Brothers, Melbourne, Sidney, Dunedin, Brisbane, Perth

BELGIUM AND HOLLAND—C. Dubbelman, 48 Rue de Luxembourg, Brussels

ARGENTINE AND URUGUAY—C. S. Clarke & Co., Calle 25 de Mayo, No. 158, Buenos Aires

NATAL, TRANSVAAL AND ORANGE RIVER COLONY—Thomas Barlow & Sons, Durban, Natal

ITALY—Giovanni Checchetti, Piazza Sicilia 1, Milan

October Convention Exhibit

AS in former years, the Brill Exhibit at the Railway-appliance Exposition held in connection with the annual convention of the American Electric Railway Association at the Million Dollar Pier, Atlantic City, from October 9 to 13 inclusive, will be located conspicuously to the left of the main entrance of the Main Building. The Brill 27-M.C.B. Truck, with its new Brill Bolster Guide and Side Swing Dampener, its solid-forged side frames, Half-ball Brake Hangers and Brill Graduated Spring System, will be exhibited. Attention is especially called to the Brill Bolster Guide, the most important of all recent developments in truck design. Master Mechanics will be particularly interested in this device, which eliminates chafing plates with their friction and "locking" due to brake pressure and motor force. The new Brill Renitent Window Post is bound to command a great deal of attention—don't fail to see it and be *posted* on the greatest car feature of the day.

THE J. G. BRILL COMPANY, PHILADELPHIA

BRILL MAGAZINE

SMITHSONIAN
MAR 17 1977
LIBRARIES



Summit, Cherry & St. Clair Sts.
Toledo, Ohio



B RILL Snow Plows are built to stand up under all sorts of heavy duty; they have tremendous ramming power. The plowshares are shaped so that the impact of the snow is cut to a minimum and thus the plows roll aside huge drifts and tear their way through deep level snow at a good rate. Raising and lowering the plowshares is done by hand or air or both. The hand-hoist is operated by a large horizontal wheel with worm and gear; the heavier plowshares are counterbalanced. If air power is also used, the arrangement provides for a quick interchange. The guides on which the plowshares are raised and lowered are powerfully bolted and braced to the heavy side sills and in every particular these plows, both of the double- and single-truck type, are built to stay in fighting trim from start to finish.



H. W. Brown

PRESIDENT, DETROIT UNITED RAILWAY

What degree of success can initiative gain without power? To what heights can ingenuity climb without force behind it? How far along life's road would resourcefulness take a man without the will to do?

In all truly successful men you will find as a leading attribute of character a tremendous supply of potential energy. Or, to put it differently, the degree of success attained by each successful man is in direct ratio with his ability to carry things through to a complete finish. Initiative, resourcefulness, concentration are cardinal attributes to success but that which is absolutely fundamental, which underlies every success, is force—nowadays we hear it popularly mentioned as “the punch.”

A man with “the punch” may carry one scheme after another through to a finish, whether it be a successful finish or not. At any rate, he will have sufficient force to carry him through tight places and on and on to the end, finally making the one big success. On the other hand, the man who possesses only invention and initiative and who lacks force may leave a thousand and one workable ideas suspended in midair, there to stay until Doomsday. True, he may be lucky enough to strike the one idea that will carry through to a successful finish—but, will not the idea be carrying him and not he the idea?

Development of brute force, stamina, “punch” should not be neglected in the equally necessary rush for knowledge, for after all it is the proper application of knowledge, which is synonymous with the forceful backing-up of initiative, that really clinches success.

OCTOBER 15, 1916

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F. W. BROOKS

F. W. BROOKS, President of the Detroit United Railway, has been connected with the electric railway industry since 1895. He was born at Waco, Texas, on March 4, 1865, and educated in private schools in Waco, the Waco Military Academy and the Texas State College, making a specialty of engineering in the latter institution. In 1882 he became identified with the construction of the New Orleans & Texas Pacific Railway and afterward with the construction of extensions of the Cincinnati Southern Railway. He was later associated with the engineering and other departments of the Louisville, New Orleans & Texas Railway, which was afterward acquired by the Illinois Central Railroad. Mr. Brooks went to Detroit in 1895 as General Manager of the Rapid Railway, an electric interurban railway operating between Detroit and Port Huron. When the Rapid Railway came under the control of the Detroit United Railway in 1903 he was made Assistant General Manager of the latter company and shortly after he was made General Manager. He was elected Vice-President of the company in February of this year and in June was elected President.

INTERURBAN CENTERS AND INTERURBAN CARS

TOLEDO, OHIO



ICHIGAN'S southern boundary all but touches the outskirts of the city of Toledo, county seat of Lucas County, Ohio, fourth largest city in Ohio,

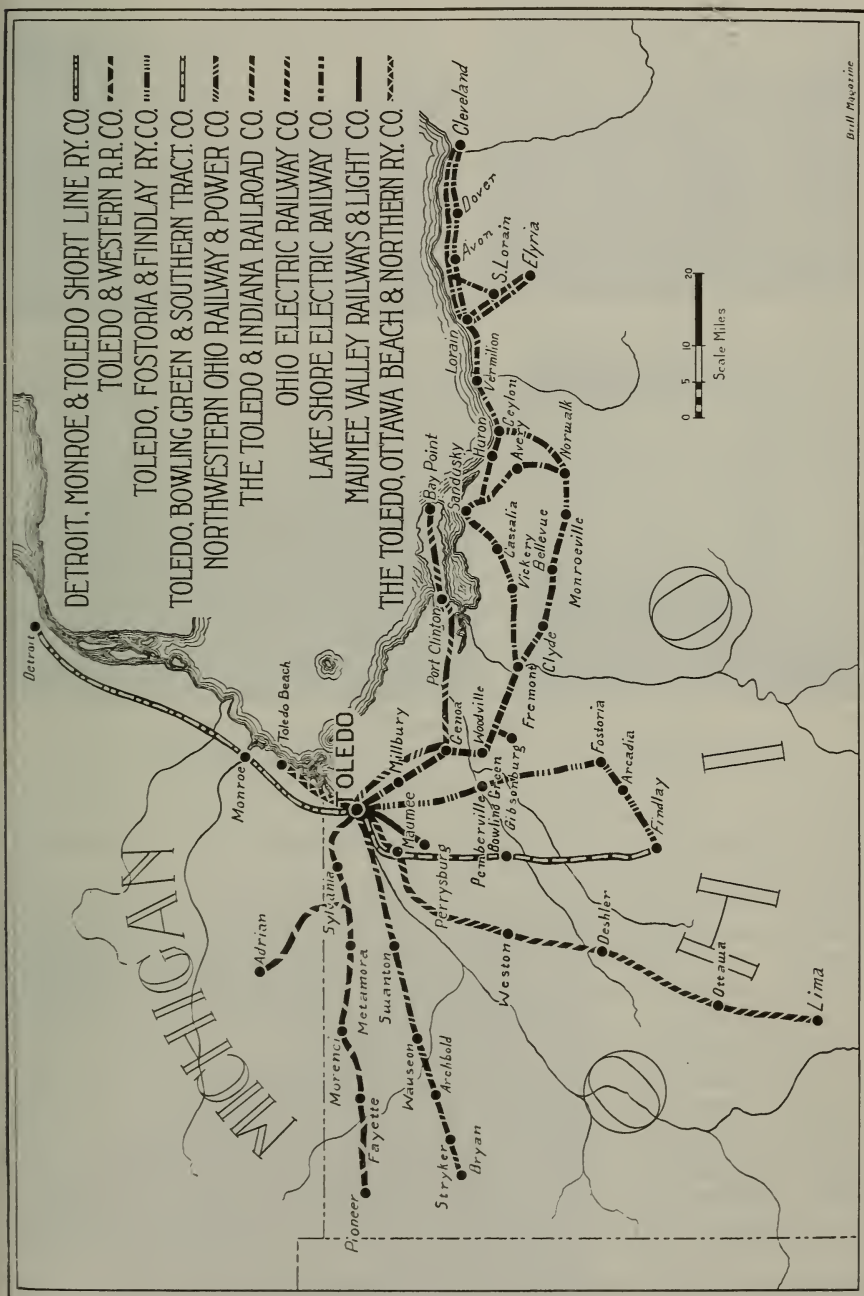
and second greatest transportation and automobile center in the country. The city is located on the Maumee River at its entrance into Maumee Bay, nine miles from Lake Erie. Its area is about 30 square miles.

Situated at the west end of Lake Erie and at the foot of the upper chain of the Great Lakes, Toledo is the natural receiving point of the ore traffic from the Lake Superior region and of grain and lumber from the northwest. Likewise it is the natural distributing point for Ohio and Virginia coal to the north and the northwest. Its harbor is one of the finest on the Great Lakes. The government channel is 400 feet wide and 21 feet deep through the bay, and from 700 to 1,400 feet wide to the farthest dock up the river. Of the thirty-five miles of river front, fifteen are lined with docks. Federal statistics for 1915 show that 7,114,483 bushels of grain and 46,318,804 tons of ore were received in Toledo.

The city is the largest shipping port for soft coal in the world, the 1915 exports exceeding 4,000,000 tons. It also is known as the principal clover seed market of the world, handling 250,000 bushels annually.

Industrially Toledo is second to Cleveland among Ohio cities. In 1915 there were 2,000 industries employing about 40,000 people. One automobile factory alone, the second largest in the world, is capitalized at \$75,000,000. This plant covers 103 acres of floor space, and employs 15,000 with a monthly payroll averaging \$1,250,000. Other important products include elevators, springs, baby carriages, scales, atomizers, wheelbarrows, electrical apparatus, linseed and castor oils, pig iron, coffee, flour, sugar and women's clothing.

The city has 420 miles of streets, 230 of which are paved, 116 miles of electric street railway, 312 miles of water mains, and 262 miles of sewers. There are twelve large parks and forty-one triangular parks, covering 1,024 acres and valued at \$2,500,000. A twenty-five-mile boulevard connects the parks and surrounds the city. Most of the larger parks are equipped with playgrounds and several with swimming pools. Toledo is one of five cities maintaining a municipal university. The university has thirty-six instructors and 150 full-time and 700





Standard passenger car
Power plant at Stryker, Ohio

TOLEDO & INDIANA RAILROAD

Station at Wauseon, Ohio
Car shop at Stryker, Ohio

part-time students. Special attention is given to vocational training. The water works, one of the best examples of a municipally-owned and -operated utility in the country, nets more than \$200,000 annually. The water is taken from the Maumee river and passes through several filtrations. Since 1909 \$1,000,000 has been expended on improvements and extensions.

The transportation facilities number thirty-four, including seventeen railroads operating twenty-two divisions, besides the electric interurban lines and five passenger steamship lines connecting with Detroit, Mackinaw, Duluth and

Chicago. As a railroad center Toledo ranks next to Chicago. Five divisions of the New York Central system enter the city and the New York Central Ry. Company maintains the largest freight terminal in the country in Toledo. The city is the terminus of nine railroads.

Linking Toledo with its neighboring cities and towns and connecting the rural districts through which they pass with these cities or towns is a large network of interurban electric railway lines. These include the Lima Division of the Ohio Electric Railway; the Lake Shore Electric Railway; the

Northwestern Ohio Railway and Power Company; Toledo and Indiana Railroad; Toledo and Western Railroad; Toledo, Fostoria and Findlay Railway; Toledo, Bowling Green and Southern Traction Company and the Detroit, Monroe and Toledo Short Line Railway. In addition there are two shorter lines—one, the Toledo, Ottawa Beach and Northern Railway, connecting the city with Toledo Beach, a Michigan resort, and the other, the Maumee Valley Railways and Light Company, a belt line connecting Toledo with Perrysburg. Both of these latter lines are controlled by the Toledo Traction Light & Power Company, which also controls the Toledo Railways and Light Company, operating the street railway system of the city, and which in turn is controlled by the Cities Service Company. These lines form a network of track that presents an extremely interesting subject for study by observers of interurban operation and they af-

ford a most excellent service, reaching out into the country in all directions from Toledo and furnishing splendid transportation facilities to every community served.

The Lake Shore Electric Railway System is one of the most important of the interurban lines operating out of Toledo, operating a total of 220 miles of revenue track. The system includes the Lorain Street Railroad and the Sandusky, Fremont and Southern Railway Company and connects Toledo with Cleveland and intermediate cities and towns including Fremont (14,000), Woodville (1,600), Gibsonburg (1,600), Genoa (800), Sandusky (23,000), Norwalk (7,500), Clyde (3,000), Bellevue (6,000), Huron (1,800), Vermilion (1,500), Berlin Heights (800), Milan (700), Lorain (35,000) and Elyria (18,000). This list of towns served, with the population totals, coupled with a reference to the map on page 291, gives

a good idea of the operation of the system, spacing of more densely - populated communities, etc.

The tracks of the company, from Cleveland toward Toledo, run along the shore of Lake Erie, serving several parks, beaches and resorts, which aid in boosting the company's traffic through the number of holiday-makers using these parks as



INTERURBAN CENTERS AND CARS. Lake Shore Terminal at Toledo



NORTHWESTERN OHIO RAILWAY & POWER COMPANY

Standard car
Bridge over New York Central at Port Clinton
Power plant on Lake Erie near Port Clinton
Drawbridge over Portage River
at Oak Harbor

Port Clinton passenger station
Passenger and transformer station
Steamer Columbus, plying between Bay Point,
Sandusky and Cedar Point
Genoa sub-station and shops



INTERURBAN CENTERS AND CARS. Power house at Findlay—Toledo, Bowling Green & Southern

well as many others who make their homes in or near the resorts, commuting to their places of business. Connections are made with other electric lines at Toledo, Fremont, Norwalk and at Cleveland. Thus, its traffic is increased considerably. One of the most important of these is at Toledo, where connection with the Detroit, Monroe and Toledo Short Line makes through service possible between Cleveland and Detroit and where connection with the Ohio Electric Railway makes a direct service possible from Cleveland to Lima. Six through limited cars are operated daily between Cleveland and Detroit and two through limited cars between Cleveland and Lima.

Current is generated by the company at Fremont and at Beach Park, the powerhouses, which are steam, having a capacity of 8,000 kw. The transmission voltage is 19,000 and the line is operated under 600 volts. Twelve substations, scattered over the lines, are

maintained to handle this current.

The standard car in use by the company measures 60 ft. 4 in. over the bumpers, 8 ft. 7 in. over the side sheathing and 38 ft. between bolster centers. This car has a seating capacity of 64 and weighs with trucks and fully equipped, forty-two tons. It is designed for single-end operation and is operated both singly and in trains. The latest of the cars are of steel, the others being of the composite type.

Carload freight and general express business form an important part of the operation. Altogether forty-one passenger cars are used in normal operation, a total of ninety-nine being available for use, however. On the local interurban lines the stops average about four to the mile, the cars operating on a schedule which allows for a maximum speed of sixty miles per hour. Outside of the cities about sixty percent of the trackage is laid on private right-of-way, highways being used, however, between Belle-



INTERURBAN CENTERS AND CARS. Freight terminal of Toledo, Bowling Green & Southern at Toledo

vue and Toledo and between Sandusky and Norwalk. The traffic statistics for the year ending June 30, 1916, showed a total of 8,842,697 passengers handled.

The Lima Division of the Ohio Electric Railway operates out of Toledo over a private right-of-way, covering 72 miles of single track between Lima and Toledo, with no double track whatever. The current necessary for the operation is purchased from the Western Ohio

part of the company's revenue. Seven passenger cars are used on the division under normal operating conditions.

The Toledo and Western Railroad owns and operates the Toledo, Fayette and Western Railway and the Toledo, Adrian and Jackson Railway. It connects Toledo, Pioneer via Morenci, Mich., and operates a branch to Adrian. It is controlled by the Toledo Traction, Light and Power Company, which also controls the Maumee Valley Railways & Light Co. and the Toledo, Ottawa Beach and Northern Railway Company. Adrian has a population of 11,000 and Pioneer a population of 800. The total tributary population including the towns served is approximately 27,000. Eighty miles of single track are neces-



INTERURBAN CENTERS AND CARS. Freight house at Bowling Green—Toledo, Bowling Green & Southern



INTERURBAN CENTERS AND CARS. Concrete bridge across Maumee River near Toledo—Ohio Electric

sary for the company's operation.

Current is purchased from a 50,000 kw. steam plant, the transmission voltage being 20,000 and the line-operating voltage 600. Rotary stations are located at Fitch, Sylvania, Metamora, Lyons, Morenci, Alvordton, Blissfield, and Adrian. During the heavy freight season (September to January) a 1,500 kw. steam powerhouse is operated at Sylvania.

The standard cars measure 51 ft. over the vestibules, 53 ft. over the bumpers, 8 ft. 8 in. over the side sheathing, 28 ft. 8 in. between the centers of bolsters, have seating capacities ranging from 45 to 60 and a carbody weight, including brake and electrical equipment, of 27 tons. Part of the equip-

ment is designed for single-end operation and part for double-end and the style of underframes varies. The cars at present are operated singly.

Freight and express business is handled the same as on steam lines, Wells-Fargo express being carried. Ordinarily ten passenger cars are in operation but the company has a total of fourteen available for use. The maximum speed is forty-five



INTERURBAN CENTERS AND CARS. Standard ticket office and substation of Ohio Electric



INTERURBAN CENTERS AND CARS. Line of the Ohio Electric where it is crossed by the Wabash Railway, near Toledo

miles per hour and the stops average about two per mile. Private right-of-way is used everywhere except in the villages and towns served, about eight percent of the company's lines being laid on public highways.

The traffic statistics for last year show a total of 820,000 passengers carried with a revenue of twenty-eight cents per car-mile. The freight records show 10,850

loads or 8,000,000 ton miles or 172,300 train miles. The freight earnings constitute forty-three percent of the total and the passenger earnings are fifty percent of the total. The total earnings are \$354,000 and the power earnings increase this total by \$30,000.

The Toledo and Indiana Railroad connects Toledo, Inverness, Holland, Swanton, Delta, Wauseon, Pettisville, Archbold, Stryker and



INTERURBAN CENTERS AND CARS. Passenger and express car of Ohio Electric



INTERURBAN CENTERS AND CARS. Car used for limited service on Ohio Electric

Bryan. The populations of the cities and towns along the route are as follows: Bryan (3,500), Holland (200), Swanton (1,800), Delta (2,600), Wauseon (3,000), Pettisville (300), Archbold (1,800) and Stryker (1,600). Fifty-two miles of single track comprise the system.

The company generates its own current at its own powerplant at Stryker. This plant, operated by steam, has a present capacity of 1,200 kw., which capacity it is the intention of the company to increase later on to 3,200 kw. The transmission voltage is 13,200 and the line-operating voltage 600, substations being located at Vulcan, Midway, Delta and Pettisville.

The company's standard car measures 50 ft. over the vestibules, 52 ft. over the bumpers, 8 ft. 9 in. over the side sheathing, 27 ft. between bolster centers, has a seating capacity of 54 persons, a carbody

weight (including brake and electrical equipment) of 18 tons and a weight of car and trucks, fully equipped, totaling 32 tons.

Wells-Fargo express is handled as is also package and carload freight. Normally five passenger cars are in use, but the company has a total of nine available. A maximum speed of 45 miles per hour is attained, the stops averaging two to the mile.

The company's traffic statistics for last year showed a total of 875,708 passengers and 84,088,114 pounds of freight carried.

The Northwestern Ohio Railway and Power Company connects Toledo, Genoa, Port Clinton and Oak Harbor, and has ferry connection with Cedar Point and Sandusky. The company is controlled by the General Gas and Electric Company. It serves a total tributary population of about 23,500, excluding of course the population



TOLEDO & WESTERN RAILROAD

- 1—Typical freight train
- 2—Standard car
- 3—Station at Fayette
- 4—Electric locomotive

- 5—Mail car
- 6—Station at Adrian
- 7—Typical freight and express car
- 8—Station at Lyons



INTERURBAN CENTERS AND CARS. Typical roadbed on Lake Shore Lines

of its terminal, Toledo. Of this tributary population 16,500 is located in the cities and towns along the route. Fifty-one miles of single track are operated.

Connections are made at Toledo with all the lines entering that city and at Genoa connection is made with the Lake Shore Electric. The company generates its own current in a 4,500 kw. steam powerplant at Port Clinton. The current is transmitted over the lines at 20,000 volts and the line-operating voltage is 600. Substations for the transformation of this current are located at Ryan, Genoa, Oak Harbor, Port Clinton and Marblehead.

The standard car in use by the company measures 50 ft. over the vestibules, 51 ft. over the bumpers, 8 ft. 9 in. over the side sheathing and 28 ft. 6 in. between bolster centers. It has a seating capacity of 50 and a carbody weight (including brake and electrical equipment) of 45,000 pounds, the total weight of car and trucks being

67,550 pounds. The cars are of wood, on wooden underframes, and are built for single-end operation. They are operated singly.

Wells-Fargo express and all classes of freight business are conducted by the company. Normal operation requires a total of six passenger cars and the company has a total of ten available for use. The stops average about three to the mile and the maximum speed attained is forty miles per hour.

Last year's traffic statistics showed a total of 760,669 passengers and 196,000 tons of freight carried.

The Toledo, Fostoria and Findlay Railway Company connects Findlay, Arcadia, Fostoria, Rising Sun, Bradner, Pemberville, Luckey, Walbridge and Toledo, operating about fifty miles of single track. The southern terminus of the company, Findlay, has a population of 14,858 and the population of the other cities and towns along the route total about 14,000, which, with the total popu-



INTERURBAN CENTERS AND CARS. Typical substation on Lake Shore Lines

Southern Traction Company connects Findlay and Bowling Green with Toledo. With it are affiliated the Findlay Street Railway, the Hancock Light and Power Company and the Central Hot Water Heating Company. The cities and towns along the route range

lation of the various rural districts (20,000), makes a sizable total.

The company operates a steam powerplant at Fostoria, the capacity being 500 kw. The transmission voltage is 18,000 and the line-operating voltage 650. A substation is maintained at Pemberville.

The standard car measures 55 ft. 9½ in. over the vestibules, 56 ft. 9½ in. over the bumpers, 8 ft. 4¾ in. over the side sheathing and 34 ft. 3½ in. between centers of bolsters. The car has a seating capacity of 60 and a carbody weight of 29,550 pounds and a total weight for car and trucks, fully equipped, of 68,000 pounds.

General freight and Wells-Fargo express business are conducted by the company. The company operates a total of 5 passenger cars under normal conditions and has a total of nine passenger cars available.

For the year ending December 31, 1915, the traffic statistics of the company showed a total of 65,275 freight carmiles, 641,743 passenger carmiles and 715,378 revenue passengers hauled.

The Toledo, Bowling Green and

from 500 to 5,000 population and the line has a total tributary population of about 25,000.

The company operates a steam powerplant at Findlay with a present capacity of 2,000 kw., which will be increased to a total of 3,000 kw. by the installation of new units.

The standard car of the company measures 50 ft. over the vestibules, 52 ft. over the bumpers, 8 ft. 6 in. over the side sheathing and 32 ft. between bolster centers. The seating capacity is 46, the carbody weight (including brake and electrical equipment) is 40,000 pounds and the total weight of car and trucks, fully equipped, is 68,000 pounds. The cars are of wood, built on composite underframes and are designed for single-end operation. They are operated generally as single units, but sometimes are operated in trains. Freight of all classes and Wells-Fargo express form an important part of the company's business.

Six passenger cars are required under normal conditions for the operation of the company's schedules and altogether there is a total of 15 available for use. The maxi-

imum speed maintained is 55 miles per hour, with an average of three stops per mile. Private right-of-way is used outside of the cities, with the exception of about one mile of track between Findlay and Mortimer.

The Detroit, Monroe and Toledo Short Line Railway was described and illustrated comprehensively in the article on the interurban system of Detroit, Michigan, which appeared as the leading article of BRILL MAGAZINE for October, 1915. This line runs from Toledo to Detroit, following closely the shore line of Lake Erie until it reaches the Detroit River, which it parallels for the remainder of the distance. At Monroe, less than midway between Toledo and Detroit, there is a branch which extends to Monroe Piers, on Lake Erie. Also there is a branch which parallels the line of the company between Detroit and Trenton, which is about one-fourth of the length of the whole line. Altogether the Short Line comprises about 60 miles of track.

The Maumee Valley Railways and Light Company is a consolidation of the Toledo and Maumee Valley Railway and the Toledo, Waterville and Southern Ry. It is a short line connecting Toledo with Perrysburg, a town of about 2000 inhabitants located about twenty miles south of Toledo, Eight miles of the company's lines are

operated under trackage rights. Altogether the company has eight passenger cars and one freight car.

The Toledo, Ottawa Beach and Northern Railway Company connects Toledo with Toledo Beach, a resort owned by the company, about twenty-five miles north of Toledo on the shore of Lake Erie. This company, like the Maumee Valley Railways and Light Company, purchases its energy from the Toledo Railways and Light Company. Of the track of the company ten miles are operated under trackage rights. Two cars suffice to handle the traffic in winter, but in the summer the pleasure-seeking throngs create such a demand for transit facilities that fifty cars are put into operation. This forms one of the most striking examples of what may be done in the electric railway field with a pleasure park or resort. The increase from two cars in winter to fifty cars in summer is remarkable and worthy of thought.



INTERURBAN CENTERS AND CARS. Typical car of the Lake Shore Lines

PETER WITT TYPE CARS FOR SYRACUSE & UTICA LINES

FRONT-ENTRANCE, CENTER-EXIT

THIRTY-FIVE cars of the popular Peter Witt type, twenty-five of them for use on their Syracuse Lines and ten for use on their Utica Lines, have been delivered to the New York State Railways, by the G. C.

use of longitudinal seats throughout, the Cleveland cars have been equipped with cross seats in the rear end.

The advantages of the arrangement of the Peter Witt Car are very apparent. Conflict of outgo-



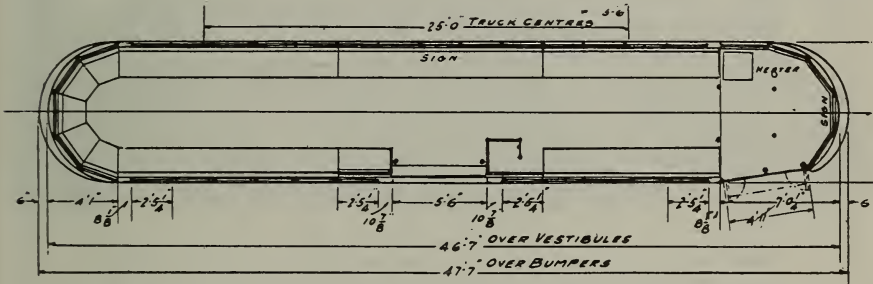
PETER WITT TYPE CARS FOR SYRACUSE & UTICA. This type of car is gaining deserved popularity, as is attested by its adoption in a number of important cities. Its arrangement very materially reduces the time consumed in loading. Passengers enter comfortably by way of the large entrance on the front platform and they continue without interruption into the car, not having to pay their fares until they reach the center, where the conductor is located

Kuhlman Car Company. These cars are similar to the cars built last year for the Cleveland Railway Company and described in BRILL MAGAZINE for August, 1915. Also a duplicate order for the Cleveland Railway (eighty in number) was described in BRILL MAGAZINE for March, 1916. The principal differences between the Cleveland cars and these new cars for the New York State Railways, lies in the length (the car shown herewith is shorter by two windows than the Cleveland car) and in the

ing and incoming streams of passengers is impossible, and, through the arrangement of the doors, the time consumed in fare collection is reduced greatly. The passengers enter by way of the front doors, which are double, passing into the car in a double stream and thus reducing by half the time that ordinarily would be taken in loading a single-entrance car, even were the conductor not obliged to hold up the line to take fares. Besides the advantage of the double-entrance door the location

of the conductor at the center of the car effects another very material saving in time. Passengers pass half the length of the car before it is necessary for their progress to be checked by the collection of fares; in other words, instead of the front platform alone serving as a space for boarding passengers to stand while waiting to pay their fare, the entire front half of the car serves this purpose. Still another advantage of the design of the car lies in the disposition of

time lost in loading, the collection of the fares being made while the car is running between stops. This segregation of the long- and short-haul traffic is made by the passengers themselves and the electing of the latter to remain in the front section of the car is of no consequence to the successful operation of the system. The space through which the passenger passes in front of the conductor is somewhat limited by a vertical stanchion in front of the longitud-



PETER WITT TYPE CARS FOR SYRACUSE & UTICA. Height from track to under side of side sills, 25 1/4 in.; height from track to under side of side sills at center exit, 9 1/2 in.; height from track to center of drawbar—at front end, 16 1/2 in., at rear end, 18 in.; height from track to top of floor, 32 3/8 in.; weight of carbody less electrical equipment, 15,881 lb.

passengers who are traveling but a short distance to remain in the front half of the car, paying their fare as they pass out the center exit later. Hence, these short-haul passengers find seats in the front half of the car and do not block the other incoming passengers.

Further, it is the tendency for passengers who intend to travel a fairly long distance to seek the seats in the rear, which ordinarily would be more plentiful because of their long-haul passengers generally being in the minority, and as they pass the conductor they pay their fares, thus reducing the

inal seat opposite and by the conductor's stand and thus but one person can pass at once with comfort from the front to the rear section and so the conductor experiences no difficulty in collecting a fare from each one of his passengers.

The entrance door is of sufficient width for two persons to enter comfortably at one time. This entrance door is protected by two folding doors. The side doors are of the sliding type and are operated separately by means of a manual-pneumatic device, the levers for the control of which



PETER WITT TYPE CARS FOR SYRACUSE & UTICA. The incoming passengers divide themselves naturally into two groups, the long-haul passengers going to the rear of the car, where there generally are more vacant seats, and paying their fares as they pass the conductor, and the short-distance passengers seating themselves in the front of the car, paying their fares as they leave

are located in front of the conductor's position. At the side doors the steps are located inside the car, thus doing away with the necessity of folding steps, and the stanchions, conveniently located, serve as grab-handles and thus the exit is safe and easy to negotiate.

The cars are built on all-steel underframes with a plate-steel side girder. Angle side sills are used, bent down at the center on the step side for the low center exit door and dropped at the front end for the entrance doors and the vestibule. The crossings are of channel and the bolsters are of the built-up type with top and bottom plate spaced by spindles. U-

shaped intermediate longitudinal members are used. The side posts are tees and the top rail is of angle.

The windows, of which there are five in the rear of the car, fourteen on the closed side and eleven on the door side, have stationary top sashes and bottom sashes arranged to raise. The roof is of the Brill Plain Arch Type, the ventilators down each side and the lights down the center of the car. At the motorman's end there is installed a heater, directly opposite the entrance doors. The windows are protected on the door side of the car with a five-bar guard, and on the closed side with a screen.

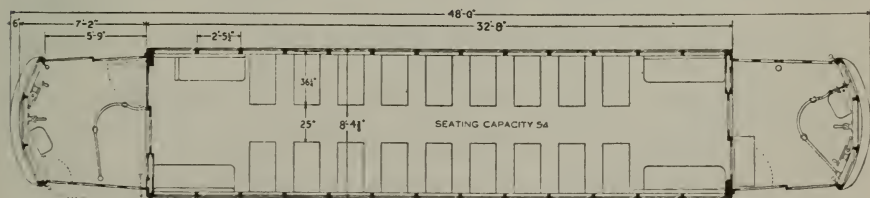


CARS FOR CHICAGO & INTERURBAN AND HAMMOND, WHITING & EAST CHICAGO

INTERURBAN AND CITY TYPES

THE Chicago and Interurban Traction Company, operating a 54-mile line between 63d Street, Chicago, and Kankakee, recently received from the American Car Company, of St. Louis, Mo., a 38-ft. combination passenger and smoking interurban car, to replace a similar car recently destroyed by fire. Almost at the same time the American Car Company shipped to the Hammond, Whiting and East Chicago Railway four 32-ft. 8 in. closed city type cars very similar in design to

the type of car used on the Chicago Surface Lines. Both the Chicago and Interurban and the Hammond, Whiting and East Chicago are under the same management. The latter road is closely connected to the Chicago Surface Lines, a fact which doubtless influenced the selection of the type of equipment. The Hammond, Whiting and East Chicago is operated in connection with the Calumet and South Chicago Railway Company, entering Chicago over the tracks of that line. The Calumet and South Chi-



CARS FOR CHICAGO & INTERURBAN AND H. W. & EAST CHICAGO. Height from track to underside of side sills, 35 in.; height from underside of side sills over trolley boards, 8 ft. 7 7/8 in.; height from floor to center of headlining, 7 ft. 11 3/8 in.; track to step, 15 1/2 in.; step to platform, 12 1/4 in.; platform to floor, 10 1/2 in.; weight of carbody, less electrical equipment, 19,000 lb.; weight of trucks, less wheels and axles, 7100 lb.



CARS FOR CHICAGO & INTERURBAN AND H. W. & EAST CHICAGO. This car is very similar to the type of car used on the Chicago Surface Lines. It has an exit on both front and rear platforms

cago Railway is being operated by the Chicago Surface Lines, which indicates the close connection between the latter and the Hammond, Whiting and East Chicago. Thus the Chicago Surface Lines have an outlet into Hammond, Whiting and East Chicago and the Hammond, Whiting and East Chicago line has a direct means of ingress into the city over the Chicago Surface Lines. The cars follow in general the design of the Chicago Surface Line cars except for the trucks—Brill 77-E trucks have

been substituted for the Brill 39-E trucks which were used under the latter—and the monitor-deck roof. The Chicago Surface cars were described in an article appearing in BRILL MAGAZINE for February, 1915.

The Hammond, Whiting and East Chicago lines extend from State Line to Whiting, East Chicago, Indiana Harbor, Indiana, and Hammond. Exclusive of the city of Chicago the lines serve a total population of about 65,000. Throughout the Pay As You Enter method of fare collection is used on the cars of the company and the densest traffic points on

the line have been found to be Hammond and East Chicago, located three miles apart. Over the entire route the stops average about 50 to the mile, making possible a speed of about 15 miles per hour.

The new cars differ from the old equipment of the company in that they are of the closed P. A. Y. E. type, as against the single-end type of the old cars. The officials hope by means of the new equipment to reduce very materially the number of accidents to passengers

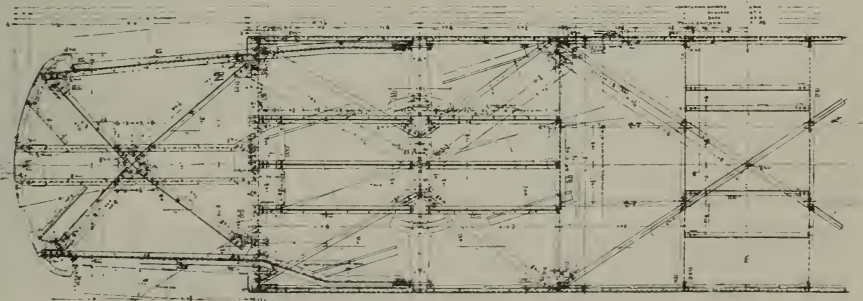
boarding and leaving the cars. Altogether the company has about nine miles of single track, which is covered by one fare. The operation of the company gives an average total of 306,000 passengers monthly.

The Chicago and Interurban Traction Company owns a total of 47 miles of single track, operating from 63d and Halsted Streets in Chicago to Kankakee. Altogether the cars of the company serve a total population of about 80,000. The territory served is both rural and industrial in nature. In addition to the regular demand for service the company depends on park traffic, reaching Calumet Grove and parks at Blue Island and Kankakee, Oakdele and Electric Parks, all of which aid very materially in boosting the gross receipts of the company. The car supplied this company is mounted on Brill 27-M. C. B. trucks designed for high-speed service, which makes it possible for the company to operate a rapid schedule, averaging 27 miles per hour, which is good when the frequency of stops is taken into consideration. The

traffic statistics of the company show a monthly average of 225,791 passengers and 67,257 carmiles. In addition to the large passenger service the company does a good freight business.

The Hammond, Whiting and East Chicago cars are built on underframes of steel with angle side and end sills and intermediate sills, channel crossings, tees as the intermediate longitudinal members in the bolster panels, and $2\frac{1}{4}$ by $\frac{1}{4}$ in. steel bar diagonal braces. The bolsters are of cast steel, I-beam section, ten in. deep at the center and designed to carry safely an 11,000-pound load at each end when supported at the center. The bolsters are tested also for a load of twenty-two tons, applied at the center with the ends of the bolster supported. The ends of the bolsters are ribbed down under the side sills and suitable openings are cut in the web to provide passage for the motor control conduit, air-brake pipes, hand-brake rods, etc.

In the platform the side knees are of $\frac{1}{4}$ in. plate reinforced on both sides with 2 by 2 by 5-16 in. steel angles. These side knees are



CARS FOR CHICAGO & INTERURBAN AND H. W. & EAST CHICAGO. Side and end sills are of angle, crossings of channel and diagonal braces are steel bars. The bolsters are cast steel



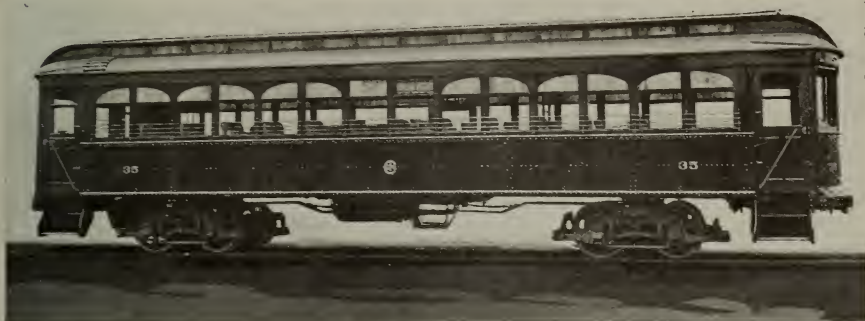
CARS FOR CHICAGO & INTERURBAN AND H. W. & EAST CHICAGO. These cars are an improvement over the old equipment of the company in that they have the P.A.Y.E method of fare collection

bolted to a lug on the body bolster and are fastened to the bumper with 6 by 6 in. angle brackets, the sides of the bumpers being fastened to the side knees with 2 by 2 in. steel angles, riveted to the knee and bolted to the bumper. The side knees are suspended from the body end sill by stub-end strap bolts. Also, these side knees provide a means of fastening the flooring, having yellow pine nailing strips. The center knees in the platform are 4 in. I-beams extending from the bumpers to the end sills and fastened to the bumpers by 5 by 3½ in. steel angles and to the end sills with gusset plates. Nailing strips are laid on these center knees also. The bumpers are of 8 in. steel channel and where

they are bent in at the sides the top flange is cut off for the oak crown piece. Diagonal angles 2 by 1¼ by ¼ in. are used to brace the platform framing.

The cars have a double flooring, the bottom laid crosswise and the upper laid lengthwise, the two separated by non-absorbent felt. The top flooring is of maple and the bottom of pine, both layers tongued and grooved. In the aisle and in the standing space of each end of the car there are provided maple floor mats screwed to the bottom floor.

In the body framing, the body posts are of ash 2⅝ in. wide, both side posts and corner posts mortised and tenoned into subsills resting on the side girder angle, to

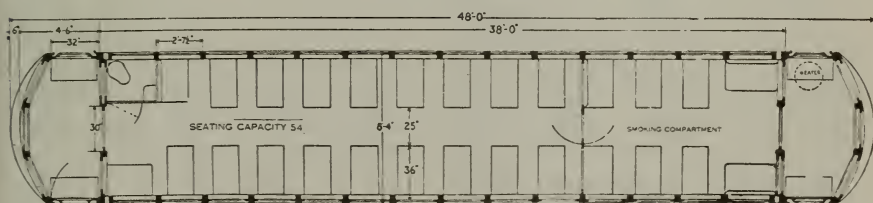


CARS FOR CHICAGO & INTERURBAN AND H. W. & EAST CHICAGO. This car, mounted on Brill 27-M.C.B. Trucks, will aid the company in quickening its schedules. The territory served is a combination of the rural and industrial. Parks also play a part in the company's service. The car was photographed on temporary trucks

which they are bolted. The side posts are reinforced directly above the belt rail with wood screws. The side subsill is bored with $\frac{3}{8}$ in. holes so as to drain any moisture that may collect between the steel sill and the subsill.

Both outside and inside the vestibules are sheathed with sheet metal in three sections. All lower sashes in each vestibule are arranged so as to drop to the level of the belt rail and are provided with catches so as to hold the sash at three different positions when open. The sash pockets easily may be cleaned because the inside dash

is cut off at the floor so as to allow for cleaning. The platform hoods are protected by guards against wear from the trolley rope and are also equipped with gutters over the door openings to lead the water off at the proper angle so as to obviate a drip on the steps. Each bulkhead has one swinging and one sliding door, the swinging door arranged to swing outward, to be held in the open position on the rear platform by a catch and to be locked shut at the front platform. The runway of the sliding door is inclined about $\frac{1}{4}$ in. so that the door will close easily and



CARS FOR CHICAGO & INTERURBAN AND H. W. & EAST CHICAGO. Height from track to underside of side sills, 39 in.; height from underside of side sills over trolley boards, 9 ft. 6 $\frac{1}{2}$ in.; height from floor to center of headlining, 8 ft. 4 $\frac{3}{8}$ in.; track to step, 14 $\frac{1}{4}$ in.; step to platform, two steps 13 $\frac{1}{2}$ in. each; platform to floor, 7 in.; weight of carbody, less electrical equipment, 20,000 lb.; weight of trucks, 17,000 lb.

will remain in the closed position.

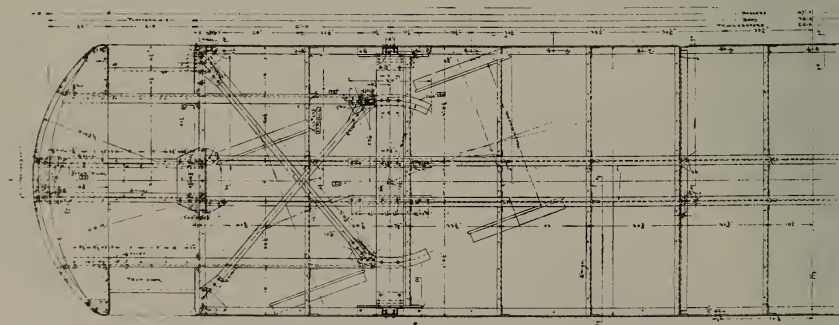
The body of the car has thirteen window openings on each side, the upper sash stationary and arranged in a continuous frame set into the posts. The lower sashes are arranged to raise vertically to the level of the bottom rail of the upper sashes and may be fastened in both half-open and open positions and at a height of three inches above the arm-rest. Storm sashes of cherry are provided for all side windows.

Each body is provided with eighteen reversible cross seats and four longitudinal corner seats, one in each corner of the car. Two of these longitudinal seats are made collapsible. Both seats and backs are upholstered in rattan over springs. Collapsible seats are installed on each platform, one four-person seat along the vestibule folding doors and one two-person seat in front of the body swing door, each made to fold up and held in place behind the doors when not in use.

The cars are mounted on Brill 77-E trucks. These trucks are

identical in design with that of the 76-E truck, except that the motors in the 77-E are hung inside the frame. Both 76-E and 77-E are derivatives of the well-known 39-E truck, the spring arrangement and general design being identical, except that, in place of the large wheel and pony wheel of the 39-E, the 77-E has wheels of the same diameter. Brill Half-ball Brake Hangers and solid-forged side-frames are important features of the truck. The combination of Brill Bolster Guide and Graduated Spring System lends to the truck an ease of movement that is creating very favorable comment.

The Chicago and Interurban car is a typical semi-steel, double-end, two-compartment (passenger and smoking) interurban type mounted on Brill 27-M. C. B. trucks. The car is built on an underframe made up of steel plates and structural shapes, the side sills of 5 by 3½ in. angle, end sills of 6 in. channel, center sills of 6 in. I-beams and the bolster of the built-up type, with top and bottom plates. In the body frame, corner posts are of ash, 2¼



CARS FOR CHICAGO & INTERURBAN AND H. W. & EAST CHICAGO. The side sills are of angles, end sills of channel and the center sills of I-beams. The bolsters are built up of plates



CARS FOR CHICAGO & INTERURBAN AND H. W. & EAST CHICAGO. The smoking compartment feature is always a good one for interurban service. The smoker on this car is roomy, seating 16 persons

by $4\frac{1}{2}$ in. thick. Sheet steel, 3-32 in. thick, is used as the side sheathing, extending from the under side of the side sills to the belt rail.

At each end of the carbody there is a pair of sliding doors making a 40-in. door opening between posts. Between the smoking and the passenger compartments there is a single swinging door; the upper portion of these doors is glazed and the lower portions paneled with cherry, stained mahogany. On each side of the car there are fourteen windows, the heads oval. These windows have double sashes, the top sash being made stationary and extending the width of two lower sashes and

the latter arranged so as to raise.

The smoking compartment is provided with three transverse seats on each side of the car and with a longitudinal corner seat at one end of the compartment on each side. The passenger compartment has eight transverse seats on one side with a corner longitudinal seat and the opposite side of the passenger compartment has nine transverse and one corner longitudinal seat. The transverse seats are of the Brill "Winner" type, all upholstered in rattan. This seating arrangement gives a capacity of sixteen persons for the smoking compartment and thirty-eight persons for the passenger compartment.

STORAGE-BATTERY CARS FOR TOWSON & COCKEYSVILLE

BRILL 71 TRUCKS

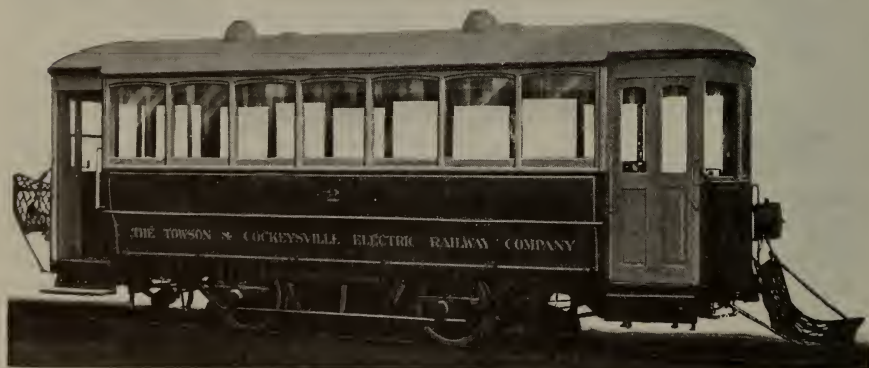
FOR operation on the Towson & Cockeysville Electric Railway, The J. G. Brill Company recently completed an eighteen-foot storage battery, longitudinal seat car, mounted on a Brill 71 Truck. This car was put into service immediately upon its receipt and now is operating about 113 miles per day, maintaining an hourly schedule for eighteen round trips over the line of the company. This remarkable operation is made possible by the installation of a battery of unusual size, enabling the company to run the car a longer time without charging than it otherwise could be operated.

The Towson & Cockeysville Electric Railway was constructed in 1912. The line is a short one connecting the Northern Central Ry.

at Timonium, Md., with Towson, county seat of Baltimore County. The latter town has a population of about 3,000 and is located seven miles from Baltimore.

The terminus of the Baltimore-Towson Branch of the United Railways and Electric Company is located in front of the Courthouse in Towson, at which point is located also the Towson terminus of the Towson & Cockeysville Electric Railway Company. The line of the Towson & Cockeysville, after passing through several streets of Towson, is built entirely upon private right-of-way, 66 ft. wide, and with easy grades except the grade entering Towson, which runs for a half-mile at five percent.

About one and one-half miles from Towson the village of Luther-



STORAGE-BATTERY CAR FOR TOWSON & COCKEYSVILLE. Operation since 1912 with a storage-battery car has proved the adaptability of that type to this line

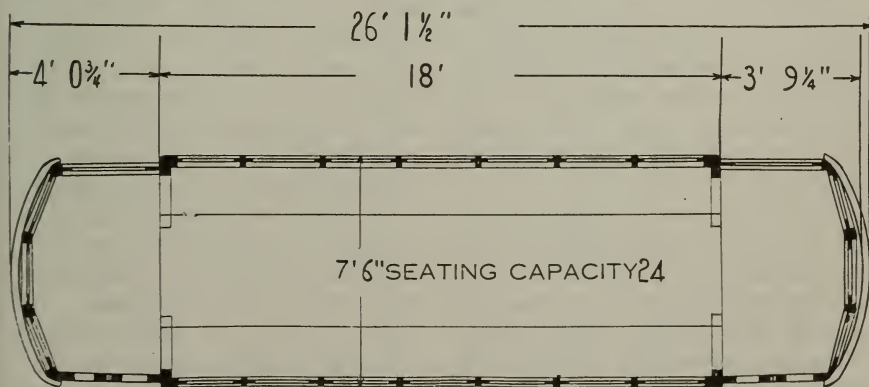
ville is passed. Here is located a girls' seminary and, besides, the village has a population of about 750. At Timonium, one mile and a half beyond Lutherville, is located the Maryland State Agriculture Association, which annually holds a county fair for six days. The traffic carried is largely an exchange of business from the Northern Central Ry. of those persons coming to the county seat on court matters and on county business. A large portion of the traffic is made up of school children attending the high school in Towson and the State Normal School located near Towson.

The Towson & Cockeysville Electric Railway Company has been operated since its inception by a storage battery car. One car, purchased in 1912, has been in successful operation since. The operation of this car for four years without any relief demonstrated to the company the desirability on its line of this character of pro-

pulsion, and the result was the ordering of the new car.

Approximately 150 kw. hours are consumed through the motor generator through which the batteries are charged at the Towson terminus, and the average current purchased therefore will approximate about one and one-half kw. hours per carmile.

An extension of the line from Timonium to Texas, at which point a new ammunition plant lately has been constructed, is under consideration and probably will be made during the coming season. This ammunition plant employs about 600 workmen and, should justify the extension. Upon completion of the extension the company proposes to install double-truck storage battery cars for the heavier hours of traffic. The company does not conduct any freight or express business at present, but is considering the addition of this class of service when the new extension is made.



STORAGE-BATTERY CARS FOR TOWSON & COCKEYSVILLE. Height from track to underside of side sills, 2 ft. 5 1/2 in.; height from underside of side sills over roof, 8 ft. 5 in.; height from floor to center of headlining, 6 ft. 3 1/4 in.; track to step, 14 1/2 in.; step to platform, 12 in.; platform to floor, 9 1/2 in.; weight of carbody, less electrical equipment, 5600 lb.; weight of electrical equipment, 5882 lb.; weight of trucks, 4850 lb.; weight of motors, 1980 lb.; total weight, 18,312 lb.



STORAGE-BATTERY CARS FOR TOWSON & COCKEYSVILLE. Experimentation with this type of car on this line has shown that the current purchased will average one and one-half kw. per carmile. Later, the company plans to install double-truck storage-battery cars on an extension to its line

The car is built on a composite underframe in which the side and end sills are 4 in. square, the former of pine and the latter of oak, each reinforced with a $\frac{3}{8}$ in. steel plate. The crossings are of oak, the first crossing from each end of the car reinforced with a steel plate.

There are no body bulkheads in the car, posts being placed on each side of the car at each end, extending from the floor to the underside of the door head pieces. Threshold plates are provided in the doorways.

The 71 Truck upon which this car is mounted has been used on storage battery cars exclusively,

having been designed expressly for that type of operation. Its frame is built up of angles and its motors are inside-hung. The truck is equipped with winged journal boxes, three coil springs on each box (one on each wing of the box and the third in the center). A special journal box is provided for the use of ball bearings; in fact, all of the trucks of this type that have been built up to the present time have been equipped with either roller or ball bearings. However, neither roller nor ball bearings are absolutely necessary and the trucks can be constructed, by means of another type of journal box, with plain bearings.



BAGGAGE CAR FOR NORTHERN OHIO TRACTION

BRILL 27-M.C.B. TRUCKS

THE G. C. Kuhlman Car Company has delivered to the Northern Ohio Traction and Light Company, of Akron, Ohio, a 60 ft. single-end baggage car mounted on Brill 27-M. C. B. trucks. This car is a duplicate of the car described in BRILL MAGAZINE for January of this year. Also, in the August issue of BRILL MAGAZINE, in connection with a description of the type of five semi-steel city cars built for the company, there was given a brief resumé of the company's operation.

The car is built on a composite underframe in which the side sills are of channel, flanked on either side by a yellow pine sill, the two center sills are of I-beam section and the intermediate sills are of pine, resting on angle cross members, the end sills are of angle and the bolsters are of channel with bottom plates.

The cars have a double floor, the lower floor laid crosswise and the upper floor laid longitudinally except between the baggage doors,

where it is laid crosswise, to prevent it from being scarred and torn by heavy pieces of baggage or express matter being dragged across it, against the grain.

The car is sheathed, both inside and out, with tongued and grooved poplar and at each side of the baggage doors there is provided a plate protection to guard the outside sheathing against injury in loading. Window guards are provided on all baggage and vestibule doors and on the rear windows.

The middle section of the rear vestibule is hinged so as to swing inwardly, thus making it possible conveniently to use the car for train service. The baggage doors, two on each side of the car, have an opening of seven ft. These doors slide inside of the car and are protected in their open positions by wooden framing made of slats extending from the floor to the ceiling. Adjustable racks are provided throughout the length of the car for piling baggage and boxes and other express matter.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

BRILL RAILWAY PUBLICITY SERVICE

IT is very seldom nowadays that you can get any desirable thing without paying its full value. But here is a case where something (which we modestly but earnestly believe to be well worth while) may be obtained for nothing. And that something is the assistance in handling publicity work which is offered the managers of the various electric railways through the medium of the free Brill Publicity Service. This service is no new thing—it is no experiment. For many years the Brill Publicity Department has prepared for railway managers pamphlets, folders, matter for newspapers and publicity of various forms. Three issues of BRILL MAGAZINE, prior to this issue, have carried the announcement of the decision to throw the services of the publicity staff of The Brill Company open to all The Brill Company's friends (and under that classification are included all officials or employees of electric railway companies, whether the companies with which they are attached be customers of The Brill Company and its subsidiary plants or not). Each of these announcements has brought inquiries for data on operations in various cities with various types of cars, requests for information concerning the preparation of all sorts of advertising copy—and, in short, very edifying responses have come in in answer to these announcements. In some cases it has been the pleasure of the Brill publicity staff to outline whole campaigns of advertising, to suggest the proper mediums and the proper policy to adopt in "putting the message across." Several railways have sent in their whole schemes of publicity, including their publications and displays in the local press. In one case this matter came with a request for co-operation in the endeavor to link the company more closely with the public. As a consequence, the offering of several suggestions was made possible, and, judging by the alacrity with which those suggestions were adopted and the reports of the officials on their subsequent success, the company's action in making use of the service was decidedly beneficial. The suggestions offered companies making use of this service are formulated as the result of long experience in publicity work as directly applied to the electric railway business; they are made after careful consultation of reliable data gathered over a long period of time. For ten years, through correspondence with the various railway companies in connection with the publication of BRILL MAGAZINE, information bearing on all sorts of

operating conditions and problems has been gathered and this information is thrown open to everyone through the medium of this Publicity Service. Often railway managers do not have time to devote to the supervision of their publicity work and it is at assisting such managers, saving them time and trouble, that this service is particularly aimed. In other cases very little, if any, publicity work is being done by companies that well might profit by a carefully planned scheme of advertising. These latter cases may exist for many reasons, but the most general one is that the officials cannot devote the necessary time to this publicity work. In such cases the Brill publicity staff is ready to plan and execute a whole campaign of publicity work absolutely free of charge. There are absolutely no strings attached to this service, there is absolutely no obligation entailed by anyone making frequent and liberal use of it, and it is open to any- and everyone. Two members of The Brill Company's publicity staff will be in attendance at the convention of the American Electric Railway Association, at Atlantic City, and it will be their pleasure to discuss this service in detail with anyone desiring further information and to go over any publicity matters that it may seem desirable to present to them for consideration.

A PLATFORM MAN'S MENTAL RECREATION

A MAN must be interested in his company if he would have his company become interested in him. Not alone must he be careful, polite and neat while on his job, but his hours of leisure also have something to do with his success. He must fill up his working hours with conscientious effort to do his best to promote the welfare of his company; and, when these working hours are over, there still is left for him to spend a portion of his extra time in strengthening and broadening his mind by study and reading. While on duty he should lose no opportunity to become more familiar with matters pertaining to street railway operation; while at home he should supplement this mental development through the medium of books and periodicals or by studying carefully the details of a particular department in which he may be especially interested. Any study, whatever it may be, will be materially beneficial to him, will assist him in gaining more alert and accurate intellectual power, but that study which is aimed directly at making him a more competent employe will land him soonest in an important position.

A man never moves forward unless he wants to—and works. He has to show his employers that he is altogether earnest in his desire to advance by the manner in which his work is done, by his attention to the company's being benefited while he is on the platform.

NEWSPAPER PUBLICITY

CONTINUOUS presentation of the street railway's problems to the public in the proper light is absolutely necessary. Whether the publicity necessary for this proper presentation takes the form of carcards, pamphlets, folders, bulletins, public lectures, or newspaper advertising rests entirely with the company to decide and the decision is governed in each case by existing local conditions. However, in case newspaper publicity is favored, the following suggestions for establishing with the public a good relationship (suggested by the *Electric Railway Journal*) are good:—

1. By having a publicity agent or a designated official in direct charge of press relations.

2. By voluntarily furnishing the newspapers, through such an official, with financial, operating and general data of interest to the public.

3. By giving newspaper reporters an opportunity to inspect improvements, new equipment, etc., and furnishing them with complete facts in regard thereto.

4. By giving reporters prompt and explicit information on points which they themselves raise.

5. By having occasional articles written by company officials on matters about which the newspapers desire full information.

6. By publishing occasional advertisements on

- a. Questions before the public.

- b. Problems in the industry.

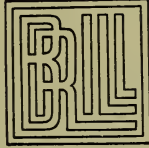
- c. Announcement of fare and schedule changes, new service, etc.

It is the man with self-respect and respect and care for others that gains admiration for himself, confidence and respect for his company, and promotion.

The surly, careless man is not the one who gives the impression that his company is endeavoring to render the best possible service.

CHANGES OF ADDRESS

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



THE J.G. BRILL COMPANY

Main Office

PHILADELPHIA, U. S. A.

CABLE ADDRESS: "BRILL," PHILADELPHIA

London Office: 110 Cannon Street, E. C.

CABLE ADDRESS: "AXLES," LONDON

AMERICAN CAR COMPANY, ST. LOUIS, MO.
G.C. KUHLMAN CAR CO., CLEVELAND, OHIO
JOHN STEPHENSON CO., ELIZABETH, N. J.
WASON MANFG. CO., SPRINGFIELD, MASS.

CIE. J. G. BRILL, 49 RUE DES MATHURINS, PARIS

CABLE ADDRESS: "BOGIBRIL," PARIS

Agencies

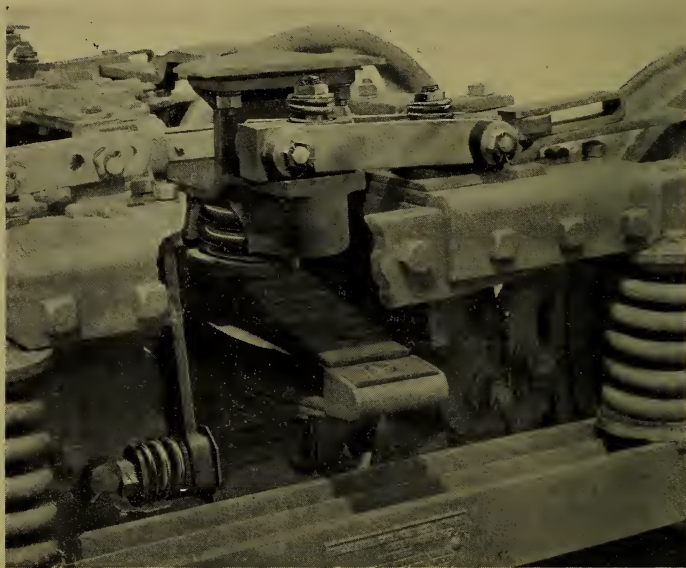
AUSTRALASIA—Noyes Brothers, Melbourne, Sidney, Dunedin, Brisbane, Perth

BELGIUM AND HOLLAND—C. Dubbelman, 48 Rue de Luxembourg, Brussels

ARGENTINE AND URUGUAY—C. S. Clarke & Co., Calle 25 de Mayo, No. 158, Buenos Aires

NATAL, TRANSVAAL AND ORANGE RIVER COLONY—Thomas Barlow & Sons, Durban, Natal

ITALY—Giovanni Checchetti, Piazza Sicilia 1, Milan



IMPORTANT IMPROVEMENTS IN BRILL TRUCK CONSTRUCTION

Bolster Guide (patented): Produces full-floating bolster, obviating chafing of bolster against truck transom, with the resultant choppy motion. No tilting of bolster under any operating condition. Bolster is pivoted on line with horizontal center of pivot plates.

Graduated Spring System (patented): Non-friction spring, graduated for light loads, producing easy riding.

Side-Swing Dampener (patented): Side easement not prevented but restricted to any desired amount by the adjustment of the nut which compresses the coil spring on the bottom swing-link pin.

Bolster Guide and Graduated Spring System standard in all well-known types of Brill pivotal trucks. Side-Swing Dampener standard in all swing bolster trucks in which spring planks are employed.

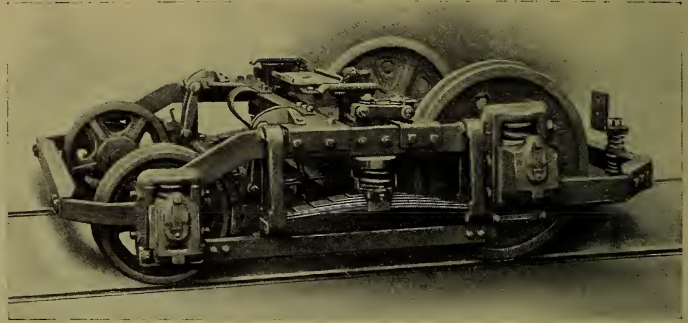
These devices are shown in the Brill Convention Exhibit. Bulletin 222, just issued, illustrates and describes them fully

THE J. G. BRILL COMPANY, PHILADELPHIA

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BRILL MAGAZINE





THE BRILL 39-E TRUCK

THE application of the Brill Bolster Guide and the Graduated Spring System to the Brill 39-E Truck has increased to a very appreciable extent the popularity of this already very popular type of city-service truck. The combination of these two devices furnishes a most efficient check on the vertical motion of the truck. The Bolster Guide, consisting of a link connection between truck transom and truck bolster with provision for up-and-down and side movement, does away with the chafing plates which formerly were used between transom and bolster and which, under brake application or motor acceleration, came into frictional contact and set up shivers and jars and jolts most injurious to the car. The Graduated Spring System consists of a non-frictional spring designed so as to carry the car when lightly loaded, the plate springs carrying all heavier loads. Thus, the car rides easily at all times, whether it be heavily loaded or not.

THE J. G. BRILL COMPANY, PHILADELPHIA



W. Ringell

GENERAL MANAGER, ELECTRIC SUPPLY CO., LTD., OF VICTORIA, AUSTRALIA

The industrial unrest from which Australia is suffering is typical of that to be found in other countries. It undoubtedly has been fostered by the advanced, and often socialistic, experiments that have been made.

The failure of the Australian Arbitration Court, and the various wage board systems, to settle industrial disputes recently has become pronounced. Increases in wages frequently are accompanied by a further slowing down of output, resulting in the cost of commodities eventually rising almost in the same proportion as the increase in wages.

What is to be the solution of industrial unrest? Will not all wage boards and arbitration courts, with their cast-iron wage levelling down process and destruction of all initiative, have to go? Destroy initiative and the reward due to special effort and the pleasure that exists in every man's work are gone. Fix an absolutely minimum living wage based on the cost of living figures for each town or district and then let further payment be by results based on either some form of piece work or profit-sharing basis.

PERCIVAL JOHN PRINGLE.

NOVEMBER 15, 1916

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PERCIVAL JOHN PRINGLE

PERCIVAL JOHN PRINGLE was born in London, December 4, 1870. He was educated at the School of Electrical Engineering, Hanover Square, London. After the completion of his education, his first employment was in research work along the lines of his profession. Mr. Pringle entered the tramway field in 1891. For about three years he was works manager for an electrical engineering firm in London, and for seven years he held the position of resident engineer in charge of contracts for the Brush Electrical Engineering Company. In November, 1900, he was appointed resident engineer in charge of the pioneer of power companies, the Midland Electric Power Corporation. Afterwards he was engaged on various tramways work, and in June, 1903, he was appointed electrical engineer and tramway manager to the Burton-on-Trent Corporation. In October, 1910, Mr. Pringle was appointed general manager and chief engineer of the Electric Supply Company, of Victoria, Ltd., in charge of lighting, power and tramway undertakings in the cities of Ballarat and Bendigo and also in charge of the electrical operation at Coolgardie, W. A. He is also consulting engineer and assessor to the Tramway Board, of Melbourne, which now owns and manages the Melbourne Cable Tramways system. He is a member of the Tramways and Light Railways Association and also M. I. E. E. and M. I. M. E., all of London. Throughout his career Mr. Pringle has been associated with many tramway inventions and improvements.

INTERURBAN CENTERS AND INTERURBAN CARS

YOUNGSTOWN, OHIO



YOUNGSTOWN, third most important city in Ohio from the standpoint of value of manufactures and generally

ranked as the State's sixth city, is located approximately halfway between New York, the metropolis of the East, and Chicago, metropolis of the West, and is virtually the heart of the great Cleveland-Buffalo-Pittsburgh district, one of the greatest wealth-producing sections in the United States. It is a focal point of four great trunk lines—the Pennsylvania, the New York Central, the Baltimore and Ohio and the Erie, and in addition is served by the Lake Shore and Michigan Southern and by three

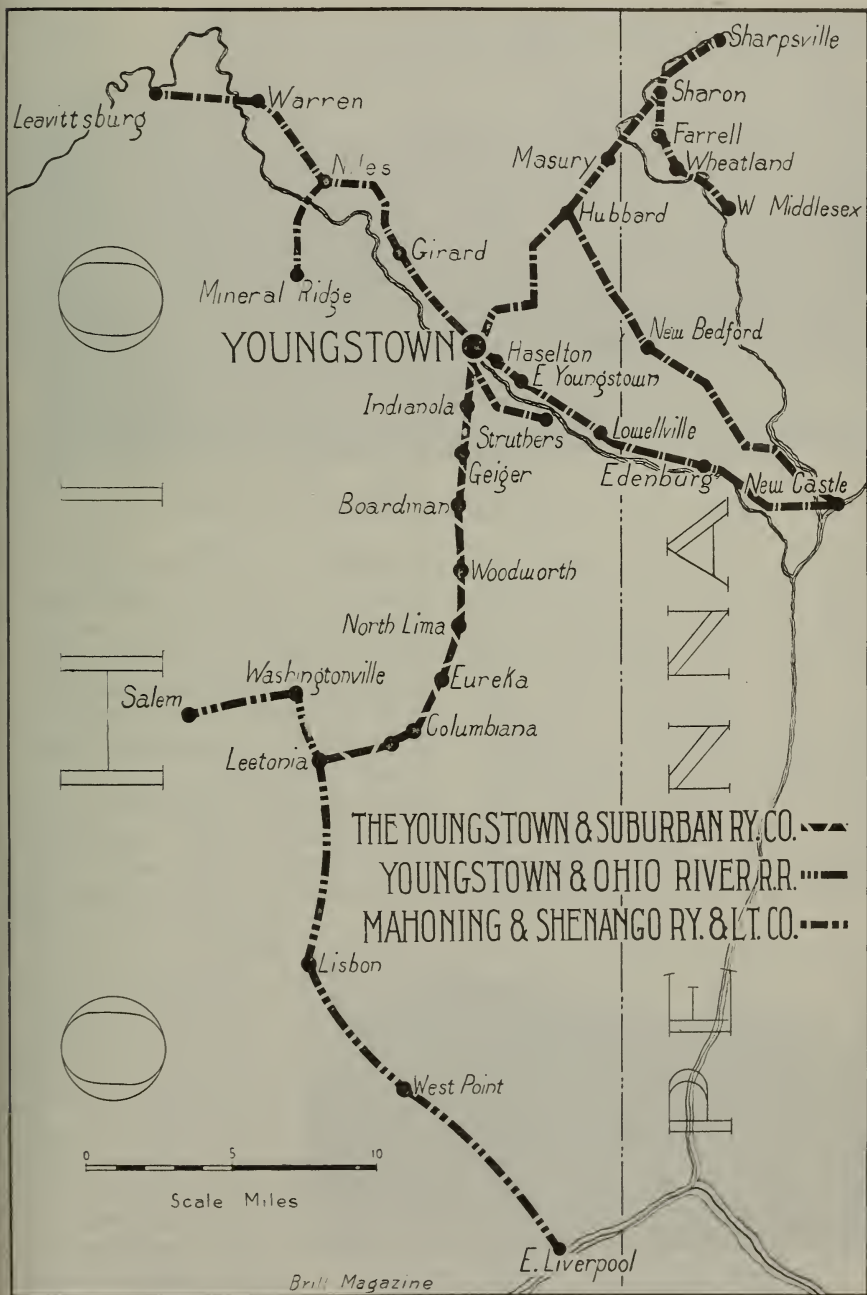
interurban electric companies. These interurban companies, through branches and subsidiaries, cover a large amount of the territory surrounding the city and provide good and frequent service.

The city, county seat of Mahoning County, is located on the Mahoning River about halfway between Cleveland and Pittsburgh and sixty-seven miles distant from each. It extends nearly six miles along the Mahoning River, northwest and southeast, and covers an area of about ten square miles. The city begins where the river valley widens and spreads mainly north and west to higher land, the business district being in the valley on the north of the river and the residential section located chiefly on the surrounding hills. A connecting viaduct, built in 1899, has proved a tremendous boom to the southern section and the south side of the city has grown rapidly.

The rapid growth of the city is shown in a comparison of the various census totals. In 1870 the total returned for Youngstown was 8,075, in 1900 it had grown to 44,885 and the next ten years produced an increase which brought the total up to 79,066. The pres-



INTERURBAN CENTERS AND CARS. Connecting point between Youngstown & Ohio River Railroad and Youngstown & Suburban at Leetonia





INTERURBAN CENTERS AND CARS. Two-car Mahoning & Shenango train in city service. Train passing from a grade of nine per cent to level track

ent estimated population is 100,000. The city is known as a healthful one, the average death rate having been computed (over a period of four years) as 15.04. The city's parks form one of its best features.

The P. and O. Canal, which was opened in 1839, stimulated mining of large deposits of block coal, which for a long time furnished a principal part of Youngstown's commerce and warranted the building of a railroad in 1856. The second blast furnace in the United States to use raw block coal and a rolling mill for making bar iron

both were built at Youngstown in 1846. Other iron works, which have formed the main industry of the place, followed. Industries closely allied with the iron industry manufacture boilers, bridges, cars, cranes, engines, forgings, machinery, metal lath and furniture, pipes, tubes, shafting, steel castings and stoves. In addition to these there are industries foreign to the iron industry—such as oil-cloth and rubber plants and works for manufacturing automobiles, cement, flour, leather and powder—which play an important part in

the progress of the city.

The territory surrounding Youngstown, as readily may be seen, gets its population in the main from the mining industries and the interurban lines which serve this territory therefore depend largely upon this class of industry.



INTERURBAN CENTERS AND CARS. Combination sub-station, car barn, division superintendent's office, employees' room and freight station on Mahoning & Shenango



INTERURBAN CENTERS AND CARS. Type of double-truck city cars in use by Mahoning & Shenango

Three companies come within the classification of the interurban system of Youngstown, although only two of these companies operate direct into the city, the third connecting with one of the other two lines and therefore linking up as a part of the city's interurban system. The three companies are the Mahoning and Shenango Railway and Light Company, the Youngstown and Suburban Railway Company (formerly the Youngstown and Southern Railway) and the Youngstown and Ohio River Railroad. The last named is the road which does not operate into Youngstown direct; it connects with the Youngstown and Suburban Railway at Leetonia. Thus a di-

rect means of travel is possible between Youngstown and Salem or East Liverpool, the terminals of the Youngstown and Ohio River. The Youngstown and Suburban operates direct from Leetonia almost due north into Youngstown.

The Mahoning and Shenango is controlled by the Republic Railway and Light Company and operates the various other companies under Republic control. The properties



INTERURBAN CENTERS AND CARS. Hubbard Junction. Combination sub-station, inspector's office, passenger and freight station on Mahoning & Shenango



MAHONING & SHENANGO RAILWAY & LIGHT COMPANY

Typical stretch of roadbed on private right-of-way

Typical stretch of roadbed along highway

Type of car in interurban service

Lowellville power-house
Private right-of-way, showing Pittsburgh
& Lake Erie R. R. in background
Entrance to Masury yard. Lake Shore &
Michigan Southern transfer track at right

consist of interurban and street lines in Youngstown, Girard, Niles, Mineral Ridge, Warren, Leavittsburg, Struthers, Lowellville, Edensburg, New Castle, Hubbard, New Bedford, Sharon, Sharpsville, Farrell, Wheatland, West Middlesex, East

Youngstown and Poland and the company furnishes power for electric lighting to fifteen of these towns. In addition, it owns gas plants in Youngstown. The Mahoning Valley Railway, a part of the Mahoning and Shenango system, controls the Poland Street Railway and leases and operates the Pennsylvania and Mahoning Valley Railway and the Mahoning Valley Southeastern Railway. This

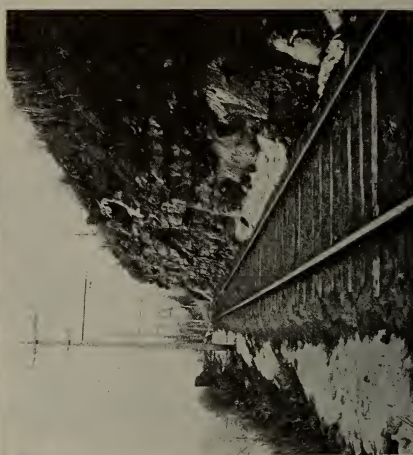


INTERURBAN CENTERS AND CARS. Passenger station at Robbins Avenue Junction, Niles, Ohio, on Mahoning & Shenango

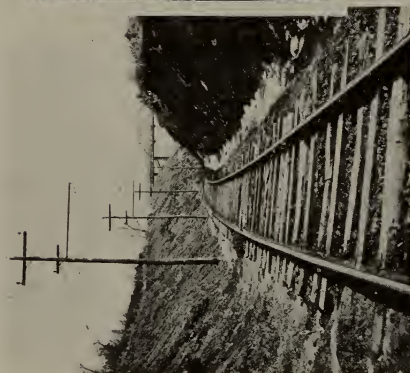
company and its subsidiaries connect Warren, Niles, Girard, Youngstown, Lowellville, Poland, Struthers and East Youngstown. Altogether it operates about eighty miles of track with a total of sixty cars. It reaches a park in New Castle, Pa., named Cascade Park, which effects a material boost in its traffic returns. The Poland Street Railway operates a line five miles long between Youngstown



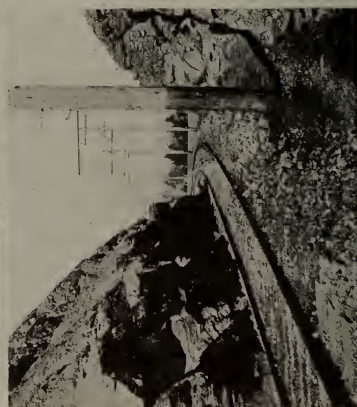
INTERURBAN CENTERS AND CARS. Interurban car of Youngstown & Ohio River on trestle



Bridge No. 40, at East Liverpool, Ohio
Typical stretch of track near Lisbon, Ohio



YOUNGSTOWN & OHIO RIVER RAILROAD
Typical track, near cut
Bridge No. 32, at West Point, Ohio



Bridge No. 30, at West Point, Ohio
Cape Horn cut



INTERURBAN CENTERS AND CARS. Standard interurban passenger car of Youngstown & Ohio River

and Poland and operates three cars. The Youngstown Park and Falls Street Railway, a line eight miles long with forty-five cars, operates in Youngstown from the Public Square to Idora Park. The Youngstown and Sharon Street Railway connects Youngstown and Hubbard, Ohio, and Sharon, Pa., operating thirty cars over twenty miles of track. Still another company under the Mahoning and Shenango Railway operation is the New Castle and Lowell Railway, of New Castle, Pa.

This line connects New Castle to Pennsylvania and Ohio State line, through limited cars of the Mahoning and Shenango being operated over the system. The New Castle Electric Company, the New Castle Electric Street

Railway, the New Castle and Mahoningtown Street Railway and the New Castle Traction Company also are included in the Mahoning and Shenango system. The Sharon and New Castle Street Railway, connecting Hubbard, Ohio, and New Bedford and New Castle, Pa., is another Mahoning and Shenango subsidiary, operating five cars over thirteen miles of track.

The larger cities served by the Mahoning and Shenango system



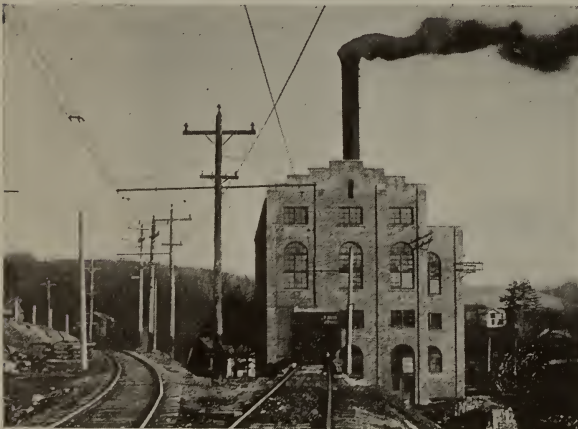
INTERURBAN CENTERS AND CARS. East Liverpool station of Youngstown & Ohio River



INTERURBAN CENTERS AND CARS. Diamond in East Liverpool, terminal of
Youngstown & Ohio River

are: Youngstown, 100,000; Sharon, 15,000; New Castle, 36,000; Warren, 11,000; and Farrell, 10,000. In addition, thirteen other smaller cities served by the company and its subsidiaries have a total population of 31,500, making a total tributary population, from these more important communities, of 203,500. Altogether 123 miles of single and 42 miles of double track are operated.

The standard car in use on the lines measures 49 ft. 7 in. over the vestibules, 50 ft. 7 in. over the bumpers, 8 ft. 2½ in. over the side sheathing, 27 ft. 8 in. between the centers of bolsters, has a seating capacity of 56 persons and a total weight of 68,000 pounds. The cars, of wooden construction, are built on composite underframes and are designed for double-end operation.



INTERURBAN CENTERS AND CARS. Youngstown & Ohio River
power-house at West Point, Ohio

Ordinarily 167 passenger cars are used on the company's lines, but a total of 191 is available for use. The maximum speed on the lines is 60 miles per hour, with an average of five stops to the mile. On all the lines public highways are used for a portion of the distance, although private right-of-way is used for part of the distance.

The traffic statistics of the system are most interesting, showing a remarkably good ratio of car mileage to passengers carried. The total of passengers carried was 45,615,786 as against a total car mileage of 7,266,220.

The company has under consideration the construction of a new line from Youngstown to Warren on the south side

of the Mahoning River (reference to the map will show the present line to be on the north side). This line probably will be constructed during the coming year. It will be a high-speed line built entirely on private right-of-way.

The company, through subsidiary companies, sells all the light and power consumed in Girard, Youngstown, East Youngstown, Lowellville, Hubbard, Sharon, Sharpsville, Farrell, Wheatland,



INTERURBAN CENTERS AND CARS. Youngstown & Ohio River power-house, showing turbines, rotary converters and switchboard

New Castle, Ellwood City and Zelenople.

The Youngstown and Suburban Railway Company formerly was the Youngstown and Southern Railway, the change in name of the company having been made within the last year. The company operates 39 miles of track between Youngstown and Leetonia with a total of 35 cars. At the southern terminus of the company—Leetonia (whose popula-



INTERURBAN CENTERS AND CARS. Standard car in use on lines of Youngstown & Suburban. Built by G. C. Kuhlman Car Company. The name of the company formerly was the Youngstown & Southern Railway, as may be seen from the lettering on the car



View showing typical stretch of ballasted roadbed
Station at Woodland, Ohio

YOUNGSTOWN & SUBURBAN RAILWAY

Picnic at Southern Park
Overhead bridge, Dewey Avenue, Youngstown

tion is about 5,000)—the company forms a junction with the line of the Youngstown and Ohio River Railroad, this making through traffic possible from Youngstown to any point on the Youngstown and Ohio River line. Also, because of a connection made at East Liverpool by the Youngstown and Ohio River with the Steubenville and East Liverpool Railway and Light Company, a through route is established to Steubenville and the Youngstown and Suburban advertises this through service extensively, publishing schedules of through trains in its map folders and other pamphlets. Also, the Youngstown and Suburban has a through route to Canton, by means

of the connection made by the Youngstown and Ohio River at Salem with the Stark Electric Railroad, operating between Canton and Salem. Thus, with two changes in each case, the passenger may travel through from Youngstown to Canton or from Youngstown to Steubenville.

In addition to these connections, with the extension of the Youngstown and Suburban lines which they effect, the company makes connection at Columbiana with the Pennsylvania Railroad for New Waterford, East Palestine, Enon, New Galilee, Beaver Falls, Rochester and Pittsburgh. At Leetonia another P. R. R. connection is made, linking the Youngstown and

Suburban up to the same cities. Also at Leetonia connection is made with the Erie for Greenford, Calla, Marquis and Canfield. The New York Central is met at Alliance and the Pittsburgh, Lisbon and Western and the Erie at Lisbon. In Youngstown connection is made with the Baltimore and Ohio, the Erie, the Lake Shore and Michigan Southern, the Pennsylvania and the Pittsburgh and Lake Erie. All of these connections are advertised by the Youngstown and Suburban, the times of connections being given.

The standard car in use on the lines measures 53 ft. 7 $\frac{1}{4}$ in. over the vestibules, 54 ft. 7 $\frac{1}{4}$ in. over the bumpers, 8 ft. 6 $\frac{5}{8}$ in. over the side sheathing, has a seating capacity of 65 and a total weight for car and trucks of 64,000 lb. The car is built for single-end operation on a steel underframe. It is operated singly. This car was built comparatively recently by the G. C. Kuhlman Car Company, of Cleveland, Ohio, and was described in an article published in BRILL MAGAZINE for December, 1915. A photograph of this car appears on page 331.

The Youngstown & Ohio River Railroad operates 37 miles of single track between East Liverpool and Salem, making at East Liverpool, Leetonia and Salem the connections which have been described. The populations of terminal cities of the

company total 35,000; the cities and towns along the route have a total population of 10,000, the total tributary population being about 300,000. In addition to the three connections described, the company connects at East Liverpool with the Tri-state Electric Railway.

The standard car in use by the company measures 48 ft. over the vestibules, 49 ft. over the bumpers, 8 ft. 7 in. over the side sheathing and 27 ft. 6 in. between the bolster centers. The combination baggage car has a seating capacity of 34 and the passenger car a capacity of 46. The cars are designed for single-end operation and are of wooden side construction on composite underframes. They are operated singly and in two-car trains. Regular standard freight business and Wells Fargo Express form an important part of the company's business, the freight being handled under steam power.

Four cars are used in normal operation, but the company has seven motor and four trail cars available for service. The maximum speed attained on the line is 45 miles per hour, the stops averaging four to the mile.



INTERURBAN CENTERS AND CARS. Youngstown & Suburban car barns at Youngstown

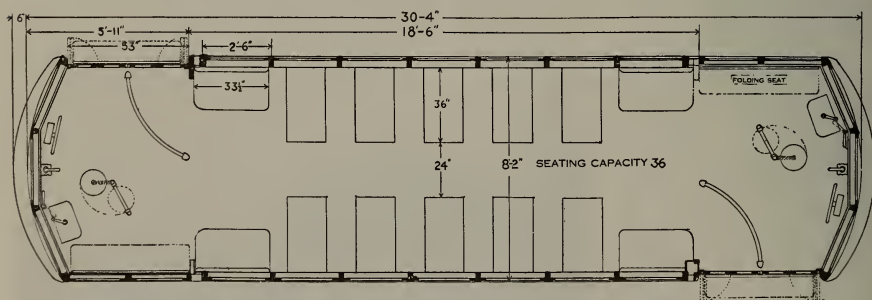


DOUBLE-END, ONE-MAN CARS FOR OTTUMWA, IOWA

BRILL 21-E TRUCKS

OTTUMWA, Iowa, a city of about 25,000 population (1910 census, 22,012) is offering itself as a very good example of the city of less than 50,000 population in which the operation of economical single-truck, one-man cars is entirely satisfactory. The Ottumwa Rail-

way & Light Company recently has received from the American Car Company, of St. Louis, Mo., five 18 ft. 6 in. double-end, single-truck cars designed for operation with one- or two-man crews and these cars have been placed in service, replacing some of the older equipment of the company. As



ONE-MAN CARS FOR OTTUMWA. Height from track to underside of side sills, 22 $\frac{1}{2}$ in.; height from underside of side sills over trolley boards, 8 ft. 11 $\frac{3}{4}$ in.; height from floor to center of headlining, 7 ft. 9 in.; track to step, 14 $\frac{1}{2}$ in.; step to platform, 13 $\frac{1}{2}$ in.; weight of carbody, less electrical equipment, 9000 lb.; weight of truck, less wheels and axles, 2740 lb.

evidence of the belief of the officials of the company in the entire adaptability of one-man operation to their lines it is the announced intention to make the type of the new cars the standard type of equipment and to have all future orders built identical with their design.

Economy of maintenance and lightness of weight of the car combined in influencing the company to the selection of the single-truck type of equipment. Another very large advantage of the new type is the use of 26-in. wheels instead of 33-in. wheels, as used under the old cars of the company. These smaller wheels bring the car closer to the ground and make access to the car a great deal easier, a feature which the company is finding to be popular with the riding public. The cars are designed for pre-payment fare collection, a good feature and a necessary one for one-man operation, and they are flexible in that they may be operated either by one- or two-man crews.

The Des Moines River divides the city into two sections, a north side and a south side. As a consequence the streets and therefore



ONE-MAN CARS FOR OTTUMWA. Folding steps operating in conjunction with the folding doors aid in the safe operation of the car by one man. The location of the fare-box, which may be seen to be convenient to the motorman's position, is shown in the photograph

the car lines of each of these districts merge into a focal point, at either end of the bridge spanning the Des Moines and connecting the two sections of the city, and the car lines spread out fan-shape over their respective sections of the city, being turned about a small loop in the northern section. As yet, of course, the system has not grown to the point where cross- or belt-lines are necessary to connect outlying points, but otherwise the

traffic layout of each of the two sections of the city is that of the typical city built on the edge of a body of water, which blocks growth in one direction; the lines spread out away from the focal point—the water—roughly in the shape of a fan.

Altogether the company has about forty cars available, of which number it operates regularly a total of fourteen, six being of the Brill Semi-Convertible type; these latter are in operation all the year around. During the summer months the oldest of the closed equipment is replaced by open cars, which have been found to meet the public approval. During 1915 the total number of passengers carried was 3,229,688, with a total of 775,052 car miles. Twenty-four tickets are sold for one dollar and school children's tickets are sold at the rate of twenty-five for seventy-five cents. The company generates its own current at a 2,000 hp. station and, besides the current used for its railway system, serves about 3,000 customers with a total of 70 miles of line. In addition the company serves about 300 customers with steam heat.

336

derframes in which side sills of $2\frac{1}{2}$ by $2\frac{1}{2}$ by $\frac{1}{4}$ in. angle are used. The end sills are of 4 in. channel, 5.25 lb. section and the cross sills are of 4 in. channel of the same section. The bumpers are of 5 in., 6.5 lb. channel. Angle brackets

braces are 2 by $\frac{1}{4}$ in. flat bars.

In the body framing the side posts are $1\frac{1}{2}$ by $1\frac{1}{2}$ in. tees and the corner posts are built up tee iron and $1\frac{1}{4}$ by $1\frac{1}{4}$ in. angle. The side girder plate is made up of 3-32 in. sheet steel, supported at



ONE-MAN CARS FOR OTTUMWA. The Brill Renitent Post forms an important detail of the construction of the car. This post, but recently adopted as a standard of Brill construction, is proving its worth through the volume of requests for it

are used to fasten these crossings to the side sills. On the closed side of the car the platforms are supported by a continuation of the side girder and on the open side by 7 in. channel step knees of 9.75 lb. section. In the platform construction center knees of 4 in., 5.25 lb. channel are used. The diagonal

the top with $1\frac{1}{4}$ by $1\frac{1}{4}$ in. angle.

One of the best features of the car is the use of the Brill Renitent post, made of bronze. This post is "new, but good"; it has proved its worth in service on a large number of operations, and the installations since its inception have been surprisingly large in number.



CENTER-ENTRANCE CARS FOR BENTON HARBOR-ST. JOE RAILWAY

BRILL 39-E TRUCK

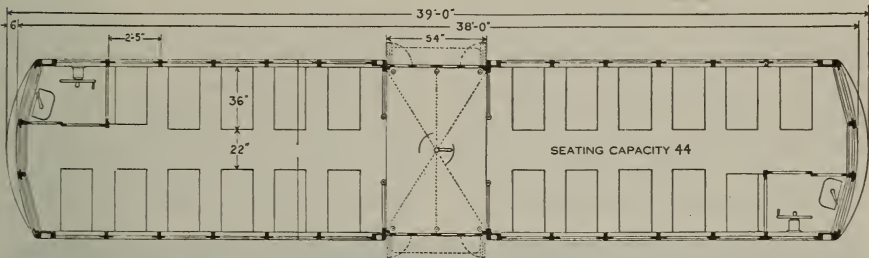
THE American Car Company recently delivered to the Benton Harbor-St. Joe Railway, two double-end, center-entrance, straight steel side cars mounted on Brill 39-E Trucks. The feature of the center-entrance is new with the company and the operation of the new cars therefore will be watched with a great deal of interest.

The cars, which will be used to supplement the present equipment of the company, will be operated in Benton Harbor and St. Joseph, terminals of the company whose populations are 10,000 and 6,000 respectively. The company has a trackage totaling about 52 miles, of which total $16\frac{1}{2}$ miles is laid in the cities and towns served by the company. The interurban tracks of the company connect Benton Harbor, St. Joseph, Meadowbrook, Kings Landing, Sebago, Tabor,

Eau Claire and Dowagiac and Coloma, Paw Paw Lake and Watervliet, these cities being located along the company's line so that the distance between their centers is only about $11\frac{1}{2}$ miles. Consequently the stops are very frequent and the average speed maintained is but ten miles per hour.

The changes of the seasons affect the company's operation very materially, single-truck cars being used to some extent during the spring and summer and the summer resort business of the company very materially increasing its revenue during the summer. One of the chief sources of increased revenue is a religious colony called the House of David, which is served by the company.

The cars are built on steel underframes. The side sills are of $2\frac{1}{2}$ by $2\frac{1}{2}$ in. angle and the cross



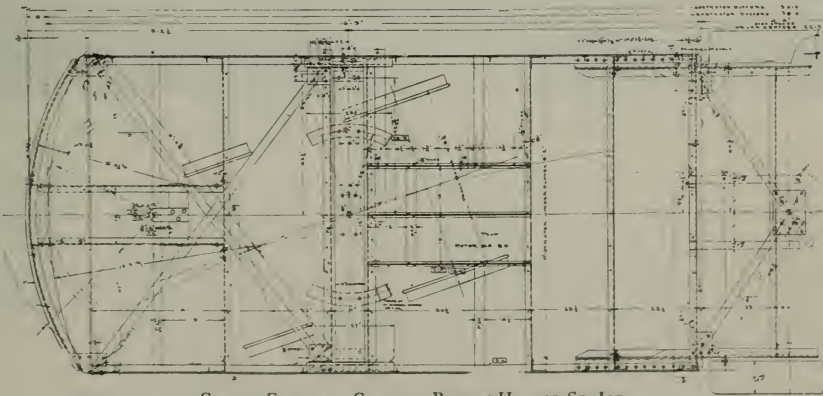
CENTER-ENTRANCE CARS FOR BENTON HARBOR-ST. JOE. Height from track to underside of side sills, 32½ in.; height from underside of side sills over trolley boards, 8 ft. 6 in.; height from floor to center of headlining, 7 ft. 6⅝ in.; track to step, 16½ in.; step to platform, 13½ in.; platform to floor, 9½ in.; weight of trucks, 2895 lb., less wheels and axles; weight of carbody, 17,000 lb.

sills of 4 in. channel, fastened to the side sills with angle brackets. The bolsters, 9 in. wide, are of built-up type with top and bottom plates. The bolsters are flanked with 3½ by 2½ in. angles. Diagonal bracings of 2¼ by ¼ in. bar are used at the ends of the car and at the center platform.

The corner posts are of 1½ by 1½ in. angle extending from side sill to top plate. The side posts are of 1½ by 1½ in. tees to take care of the Renitent post window system, which is one of the best features of the car. Below the windows the cars are sheathed in

3-32 in. sheet steel riveted to the side sill angles, the seat rest angles, the window rest angles and the metal posts. The vestibule sheathing is of wood. The top sashes are made in one continuous piece, fastened to the posts, top plates, letter boards (which are of sheet steel) and the window rests.

The center drop platform is ½ ft. 6 in. in length with a step opening on either side, each step opening enclosed with two sets of two-leaf folding doors which are arranged to fold outward and are operated in conjunction with the folding steps. This platform is provided



CENTER-ENTRANCE CARS FOR BENTON HARBOR-ST. JOE

The cars are built of steel underframes, with built-up bolsters, angle side sills and channel crossings. The center platform is provided for in the use of a heavier angle fastened to the side sill and bent down to the proper level

for by cutting off the side sills short of the car's center and carrying the platform on a pair of heavier angles fastened to the side sills and bent down to the proper level. In addition, this center platform is braced diagonally.

stationary seat on the same side as the motorman's cab. These seats are of cherry slats.

The cars are mounted on Brill 39-E Trucks, one of the most popular types of Brill standard trucks, being extensively used on urban



CENTER-ENTRANCE CARS FOR BENTON HARBOR-ST. JOE. The center entrance is a new feature on this line. The Brill Renitent Posts are an interesting part of the construction

There are twelve windows on each side of the car, the bottom sashes arranged to raise. In both sections of the car there are eleven cross seats, giving the car a capacity of 44 persons. These seats are arranged so that there are six of the reversible type on the side of the car opposite the motorman's cab and four reversible and one

lines. This truck is well adapted to all-round city service and has shown its reliability and propensity for giving satisfactory service by its record of operation under widely variant conditions. It is the Brill standard single-motor truck and has held its position as such merely by virtue of its thoroughly practical design. The low

pony-wheel end of the truck is arranged to take most of the swing and the larger part of the load therefore comes on the driving wheels, increasing adhesion and enabling the truck to start and accelerate rapidly and to take grades easily. The keeping of the pony-wheels safely on the track is taken care of by placing upon them the proper proportion of the load. The use of Brill solid-forged side frames and "Half-ball" Brake Hangers is as a matter of course an important feature of the truck, but one of the most important features—and likewise one of the newest improvements to the truck—is the combination of the new Brill Bolster Guide and the Brill Graduated Spring System. These two devices, working in combination, are important additions to the truck, providing an ample correction for the vertical motion and furnishing riding qualities which are superlatively good. The Brill Bolster Guide does away with chafing plates and consequently eliminates friction and the consequent shivers and jars in the car. Thus

what well might be termed a "full-floating" bolster is provided, the bolster moving freely up and down with no frictional contact between the bolster and truck transoms. The Graduated Spring System provides smooth riding conditions under light loads, the system consisting of a non-frictional spring graduated to carry the car when lightly loaded. When the car is loaded beyond the capacity of this spring the spring seat contacts with the cap, which is under the bolster, and the plate springs are brought into action and take care of any additional load.

Excellent results have been obtained with trucks equipped with these two new devices and their application has been made standard on all important Brill pivotal trucks. Ample proof of the efficiency of these devices would lie in the very apparent mechanical efficiency of their design, were it not that repeated demand for them has proved them to be a decided success. This is true in the case of every Brill truck upon which the devices have been made standard.

In the early days of street car construction cars were painted in more or less of a hit-or-miss fashion; they were made so that "they would look nice." Nowadays that is done away with. The men who superintend the selection of the colors are experts in choosing the color that will wear best. That is because, due to the larger quantity of equipment in service on the average road of today, the maintenance account is watched more closely than heretofore. The choosing of the color scheme for a road has become quite an important feature of the preparation of the specifications.

STORAGE BATTERY CARS FOR MATANZAS, CUBA

BRILL 71 TRUCK

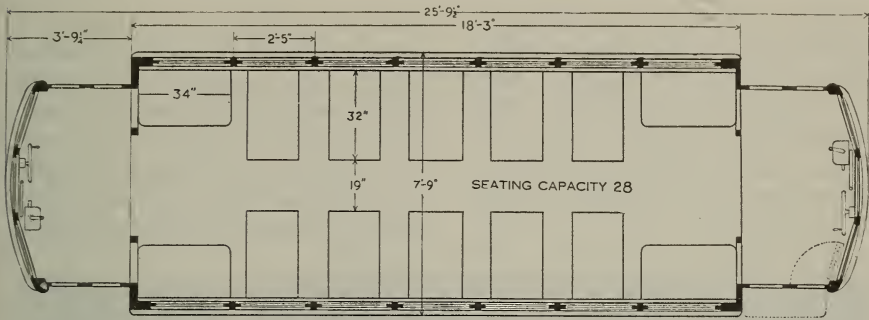
TWELVE storage-battery cars, with a carbody length of 18 ft. 3 in., have been shipped by The J. G. Brill Company to the Yumuri, Matanzas & Bellamar Railway Company, of Matanzas, Cuba. These cars, which are the initial electric equipment for the company, are very similar to those built for the Cape May, Delaware Bay & Sewell's Point Railway, of Cape May, N. J., which cars, built in 1912, have been rendering efficient service.

The railway company in Matanzas takes its name from the city of Matanzas, the Yumuri Valley and the Bellamar Caves, Bellamar being but a comparatively small settlement. Matanzas, however, has a population of about 60,000, and is commercially important as the dis-

tributing and shipping center for a large sugar-growing section. Matanzas probably is the best known of all the northern ports of Cuba. It is located 60 miles from Havana and is readily accessible by train, being a favorite objective point for excursions and for all travelers to the island. The city, with its beautiful tropical verdure, its interesting caves and its quaint general aspect, possesses much that is fascinating and interesting to the traveler to Cuba's shores. It is served daily by four trains to and from Havana, the trip leading through extensive sugar-cane fields which are among the most productive in Cuba. At several points along the route the road runs through a deep cutting covered with dense tropical foliage, and it



STORAGE BATTERY CARS FOR MATANZAS, CUBA. These cars are similar to an order built for the Cape May, Delaware Bay & Sewell's Point Railway, of Cape May, N. J.



STORAGE BATTERY CARS FOR MATANZAS, CUBA. Height from track to underside of side sills, 2 ft. 5½ in.; height from underside of side sills over roof boards, 8 ft. 2½ in.; height from floor to center of headlining, 7 ft. 9 in.; track to step, 15½ in.; step to platform, 12 in.; platform to floor, 5½ in.; weight of carbody, less electrical equipment, 4800 lb.; batteries, 4500 lb.; electrical equipment, 500 lb.; weight of truck, 4785 lb.; weight of motors, 1300 lb.; total weight, 15,885 lb.

also passes through extensive orange orchards.

Approaching Matanzas, the traveler sees the lofty, solitary peak of "Pan de Matanzas"; forming a picturesque background for the city. The city nestles low among surrounding hills, its elevation being only about 100 ft. above the level of the sea. It is divided into three distinct parts, each part known by a different name and separated by the San Juan and the Yumuri Rivers. The part between the two streams is known as the "Old Town", that on the northern bank of the Yumuri is Versailles and that on the south bank of the San Juan is known as "Pueblo Nuevo", or "Old Town". The city's most noteworthy buildings center about a charming park, called the "Plaza de Libertad", and embowered in palms, flowers and foliage. The residence section of the city, however, is located in the Versailles district. The Paseo Marti is a wide street or avenue with little parks in the center—

much like the Prado of Havana. It offers a splendid view of the bay and harbor and leads to the military road to Fort San Severino, a spot made famous as the scene of the death of the "immortal mule". the only casualty resulting from the bombardment of Matanzas by Sampson's guns in 1898.

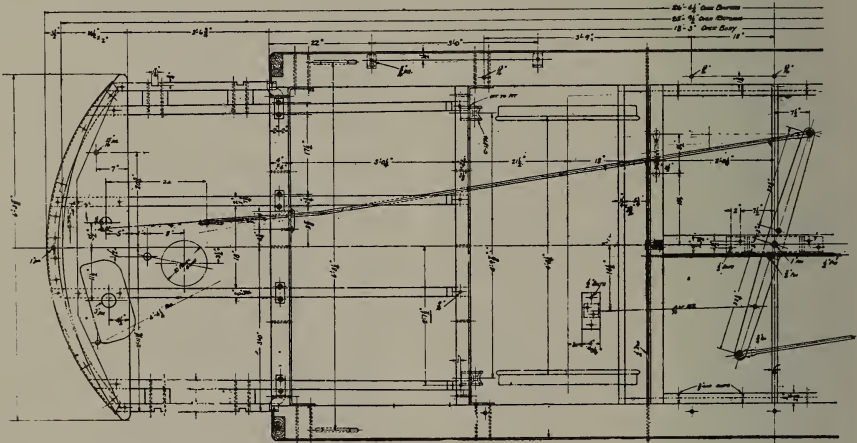
The Yumuri Valley is so wonderfully picturesque that it has been called the "Vale of Paradise" and its beauties are spoken of more frequently than those of any other spot in Cuba. The Yumuri is a deep basin-like vale enclosed within steep, verdure-clad hills and with a stream wandering among the greenery in the center, while on every hand grow graceful royal palms, their white, ivory-smooth stems standing boldly out against the background of green and their plumed tops rising in dignified fashion over all. This valley is overlooked from the crest of Cumbre Hill, which is immediately above Matanzas and which is crowned by the chapel of Mont-

serrate. This chapel, although of comparatively recent date (1870), is of particular interest, being venerated as a sacred shrine. Many miracles have been credited to "Our Lady of Montserrat", and from far and near pilgrims journey to the shrine.

The Bellamar Caves, in a hill 2 miles southeast of Matanzas, are no less famous than the Yumuri Valley. They are entered through

they are regarded as being even more beautiful in their formation. There are numerous chambers, halls, passages and galleries, with underground streams, deep chasms and bridges, the largest chamber (called the Gothic Temple) being nearly 250 ft. in length and 75 ft. in width.

The cars are erected on wooden underframes, in which side sills of 4 by 4-in. yellow pine are used, the



STORAGE BATTERY CARS FOR MATANZAS, CUBA. The underframes upon which these cars were built are of wood. The cars are mounted on the Brill 71 Truck, especially designed for storage battery work

a small building, the visitor passing down a broad stairway cut in the solid rock and leading directly down to an enormous subterranean gallery. The caverns are illuminated with electric lights and the effect of these, glinting on the thousands of stalactites, is very wonderful. The caverns are known to extend for 4 miles and in some places they are more than 100 ft. in depth. Although they are not so large as the Mammoth Cave in Kentucky, or the Luray Cavern,

end sills being of oak of the same dimensions and the crossings $2\frac{3}{4}$ by $3\frac{1}{8}$ -in. oak. In the body frame the corner posts are $2\frac{7}{8}$ in. and the side posts $1\frac{1}{2}$ in. thick, the sweep of posts being 3 in. Ash and yellow pine are used throughout the body framing. The roof is of the monitor deck pattern, extending the full length of the carbody, strengthened with concealed steel rafters and equipped with ventilator sash on each side. The platform hoods, made of poplar, are detachable.

The platforms, 3 ft. 9¼ in. long, have openings and steps at the sides, the step openings enclosed with folding doors operated so that doors and steps work together. Each vestibule is provided with three windows and is sheathed outside below the windows with sheet

underside of the door head piece.

Brill specialties include sand-boxes, "Winner" seats, signal bells and "Dedenda" alarm gongs.

The car is mounted on the Brill 71 Truck, which has been used on storage battery cars exclusively. The frame of the truck is built up



STORAGE BATTERY CARS FOR MATANZAS, CUBA. These cars have the rather unusual feature of combining cross seats with the storage-battery method of propulsion

steel. The center window is provided with double sash, the top sash arranged to drop and the bottom sash stationary; the side windows are also stationary. In the car itself the windows are provided with double sash, the top sash stationary and the lower sash designed to raise. No body end doors are used, posts being placed at each side of the car at each end extending from the floor to the

of angles and its motors are hung inside the truck frame. The design of the truck includes wide-wing journal boxes, on each wing, and in the center of which there is a coil spring, making a total of three coil springs on each journal box. Ball or roller bearings may be used by means of a special journal box or, through the use of a box of another design, an ordinary bearing may be used.

EQUIPMENT FOR SCRANTON & BINGHAMTON

BAGGAGE AND ASH AND COAL CARS

THE J. G. Brill Company has shipped to the Scranton & Binghamton Railroad Company, of Scranton, Pa., two 40 ft. baggage and express cars and one 40 ft. ash and coal car, the former mounted on Brill 27-E Trucks and

rich agricultural district to the north and having for its ultimate objective the connection of Scranton, by means of a high potential electric railway system, with the flourishing manufacturing city of Binghamton, N. Y. Since its in-



EQUIPMENT FOR SCRANTON & BINGHAMTON. The importance of freight and express business to this company's operation may be seen from the fact that, in 1915, 3172 carloads of freight and express were moved, for a total of 87,801 car miles. The commodities hauled are divided among the agricultural products carried from the rich intermediate agricultural and dairying territory to the two terminals of the line, which are characterized by their manufacturing and mining industries

the latter on Brill 50-E-3 Trucks. These cars are shown in the accompanying illustrations.

Scranton, third largest city in Pennsylvania, is the principal terminus of the Scranton & Binghamton Company. About eight years ago the promoters of this company conceived the idea of providing a more frequent and satisfactory transportation between this city and the numerous thriving towns and villages scattered through the

ception the road has enjoyed a remarkable growth, both in increased mileage and gross receipts.

The territory selected for the operation of the Scranton and Binghamton line possesses many marked features and natural advantages which unite in contributing to the company's success. The character of the population served is exceptionally diversified and remunerative, consisting of a mining and industrial community

at one terminal, an unusually large and rich intermediate agricultural and dairying population and a large and rapidly-growing manufacturing community at the secondary terminal. The company, by its own lines and those of its subsidiaries, serves a population of fully half a million people and operates approximately ninety miles of street and interurban railway.

In recent years the company has

grain, hay, merchandise and general agricultural products, such as fruit, poultry, eggs, fresh meats, milk and dairy products. By an arrangement with the Delaware, Lackawanna & Western Railroad the company is afforded direct connection for the interchange of carload freight at Nicholson, Pa.

So rapid has been the increase in the company's freight and express business, that it was necessary to supplement the carrying units with



EQUIPMENT FOR SCRANTON & BINGHAMTON. The line is well dotted with thriving towns and villages, which are scattered through the agricultural territory served by the company. These towns and villages alone make a good-sized demand for traffic facilities. This ash and coal car will be used for the transportation of one of the most important parts of the company's merchandise

been paying particular attention to the development of its freight and express business. The territory operated presents an unusually promising field for this class of traffic and the success already attained has stimulated the management to increased activity in this direction. Some idea of the volume of business done may be gathered from the fact that in 1915, 3,172 carloads of freight and express were moved for a total of 87,801 car miles. The commodities carried consist chiefly of coal,

additional equipment. That is what brought about the purchase of the two express cars and one freight car. The equipment now in use (built by The Brill Company) has been proved by experience to meet fully the requirements of the company.

The baggage car is built on a composite underframe. The side sills are of yellow pine, plated with a $\frac{5}{8}$ in. steel plate and the stringers of $2\frac{3}{4}$ by $4\frac{1}{2}$ in. pine. The needle beams are of $4\frac{1}{2}$ by $5\frac{1}{2}$ in. oak and the crossings also

are of oak, the center knees being of angle iron. A truss rod is provided on each side of the car under the side sill. The bolsters are made up of plates, the top plate of wrought iron and the bottom plate of steel.

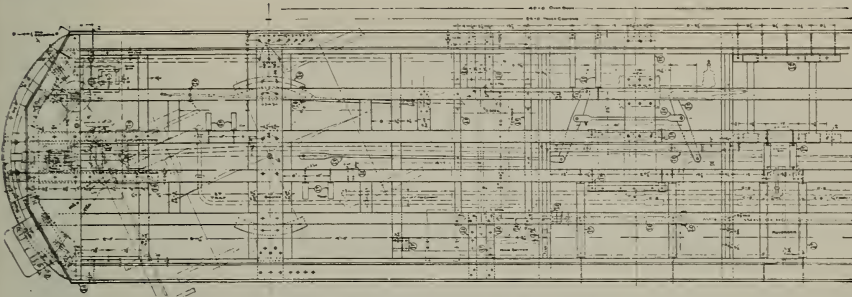
The flooring is of yellow pine except for a section between the center doors, which is of maple two inches wide alternated with $\frac{1}{4}$ by $1\frac{3}{4}$ in. iron strips, set on edge. At the side doors there are threshold plates, flush with the top of the floor. The side doors have a 5-ft. opening; their lower portions

are paneled and their upper portions glazed. These doors slide into pockets made solid, instead of from slats, as is often the case. Also, at each diagonally opposite corner of the car, on the left-hand side of the motorman, there is a door hinged to the vestibule corner posts and arranged to swing in toward the interior of the car, forming an exit and entrance for the motorman.

The motorman is divided off from the interior of the car by a partition extending about two-thirds the width of the car from



EQUIPMENT FOR SCRANTON & BINGHAMTON. The motorman is divided off from the interior of the car by a partition extending about two-thirds the width of the car from the right-hand side. A stationary window in this partition gives the motorman a view of the interior of the car. To the left-hand edge of the partition there is hinged a swinging lattice gate, which in its open position (parallel to the sides of the car) is used for holding milk cans in place. When not in use this gate may be folded back against the motorman's partition. At each diagonally-opposite corner of the car, on the left-hand side of the motorman, there is a door hinged to the vestibule corner posts and arranged to swing in toward the car's interior



EQUIPMENT FOR SCRANTON & BINGHAMTON

The baggage car is built on a composite underframe, shown above. The side sills are of pine, plated with a $\frac{5}{8}$ -in. steel plate. The stringers are of pine and the needle beams and crossings are of oak, the center knees being of angle iron. The bolsters are made up of plates, the top plate of wrought iron and the bottom plate of steel.

the right-hand side. This partition is made up of two thicknesses of $\frac{7}{8}$ in. boards. There is a two-leaf folding door hinged to the left-hand edge of the partition and arranged to fold back against the partition. There is a stationary window about two feet square located practically in the center of the partition. This opening makes it possible for the motorman to see back into the car and at the same time he is protected from falling boxes or pieces of freight, the inside of the window opening being protected with vertical iron rods spaced $3\frac{1}{4}$ in. apart. The left-hand section of the vestibule front is hinged to the vestibule post and may be swung into the interior of the car.

Hinged to the motorman's position on the left-hand edge, there is a swinging lattice gate 4 ft. 10 in. wide and 7 ft. high which, in its open position (parallel to the sides of the car) is used for holding milk cans in place. When this gate is in its open position there is a clear passage to the end door and when not in use it may

be folded back against the back of the motorman's partition.

The ash and coal car is built on an underframe made up of steel plates and structural shapes, the side and end sills of 12 in. channels, the two stringers of 10 in. channel, the crossings of 6 in. channel and the bolsters of the built-up type, the top plate of wrought iron and the bottom plate of steel.

The cab, in the center of the car, is about 5 ft. square and the top of it is about 8 ft. above the car floor, the floor of the cab being raised about one foot above the top of the car floor. At one end of the cab there is a hinged door and at the other end there is a window with a single sash arranged to drop.

Each side of the car is provided with ten stake pockets of grey iron, spaced four feet apart, and there are two stake pockets on each end of the car, the stakes of $4\frac{1}{2}$ by $3\frac{3}{4}$ in. yellow pine. The sides of the car are 28 in. in height. The end boards are provided with hooks so that they may be fastened to the sides of the car.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

BRILL RAILWAY PUBLICITY SERVICE

THIS year's convention of the American Electric Railway Association, at Atlantic City, saw more time devoted to the consideration and discussion of the question of publicity for electric railways than ever before has been the case. In fact, so much attention was given to the subject as to indicate the universal acceptance by the railway field of the fact that publicity is just as necessary to successful operation as is any other phase of the business. The program arranged for the discussion of the subject of publicity for the railways included some of the most prominent men in the field and at no point in the proceedings was there any intimation that railway publicity is anything but absolutely necessary to success. The papers read covered the subject from every angle and they aroused keen interest. The result was a recommendation from the Committee on Public Relations that a Central Bureau of Public Relations shall furnish member companies, in shape for popular consumption, such information as will be of assistance to them in presenting to the public the utilities' side. A still further elaboration on this recommendation is a plan which would mean the formation of what practically would amount to a press association, or syndicate, to furnish material to the companies publishing periodicals for distribution among the public. The consummation of these plans necessarily will require some little time because of the necessity for working out details, and in the meantime the Publicity Department of The Brill Company, with an earnest desire to work hand-in-hand with the Association, is offering a free railway publicity service, open to any railway, whether or not a customer of The Brill Company and its subsidiary plants, and, of course, absolutely without charge or obligation. For some time, in a somewhat limited way, we have been aiding companies seeking our assistance in the preparation of copy, handling of details or of whole campaigns of advertising and in other general ways and it was a desire to make this service more general and of more benefit to the electric railway field that prompted us to establish the Brill Railway Publicity Service, inaugurated a few months ago. In giving this free service, our motive is not entirely unselfish as we feel that it may help the railways, and anything that aids the railways reacts to the benefit of the car-building industry.

THE SLIPPERY RAIL

DESPITE the precautions that are exerted in the way of sandbox equipment on each car and in the operation of a special sand car, the fall of the year looms up as an especially dangerous period, with its gummy, slippery rails. Many things may bring about this unsafe condition of the rails—wet and decayed leaves, a heavy fog or a drizzly rain, so common in many places during fall weather, and the generally damp, sticky condition of the weather being among the causes. The weather changes cannot be helped and therefore every precaution must be taken to avoid accidents resulting from these slippery rails. The frequent and judicious sanding of the rails may do a great deal toward rendering the operation safe, but the motormen may do even more. Each motorman should bear in mind this ever-present danger and should exert extraordinary precautions to guard against accidents. He should be overly careful of vehicles in the track ahead of him. He should not allow his car to approach too closely for fear of the car sliding should the brakes be applied quickly. He should brake his car slowly and cautiously and should always have it well under control. Especially is it necessary that he have his car well under control when approaching crossings. Each crossing should be approached slowly and cautiously with the motorman ever on the alert to scent possible danger. Co-operation on the part of automobilists and drivers of wagons and carriages is of course very desirable, but it is equally as uncertain and therefore the motorman has his own row to hoe and a mighty careful hoeing he must do in slimy-rail weather.

“OFF-DUTY” SAFETY

PLATFORM men and other employes of the company who do not pay fare when riding on their company's cars while off duty should remember never to occupy a seat in a car if there are still standing passengers who have paid their fares and who therefore are entitled to a seat. Even though these men be off duty they are accepting free transportation from the company and as employes they must bear in mind that they should do everything in their power to aid the company in getting and holding the favor and confidence of its patrons. Utmost consideration and courtesy to patrons is expected of all employes at all times; also, each man should do his share toward building up for the company a reputation for safeguarding the safety of the company's passengers. One of the best ways for “off-duty” employes to aid in doing this is to refrain absolutely from talking to motormen, conductors, guards or other employes engaged in the regular performance of their duties. Also, when space is available in the interior of the car, these “after-hours” employes should step inside off the platform.

THE OFFICE MEN MAY HELP, TOO

YOU, the office men of the electric railways, are doing a great—even a vital—work. There is none of the personal contact with the public for you; you do not run the trains or collect the fares, and you may be hidden from the public eye, but the opinion the public at large holds of your road, the favor it has for it and—what is more tangible—its patronage are largely dependent upon the conduct of your work and the extent to which you serve the true interests of your company and yourself. It is fundamental to success to win the goodwill of your company's patrons and, since you do not come so often into personal contact with those patrons, you must make that effort through the platform men, by showing them a splendid example of courtesy and by encouraging them to work cheerfully and progressively for the welfare of the company—and themselves—and yourself.

Do everything in your power to assist in preventing the abuse of anything that has been provided by your company for your safety and comfort and the safety and comfort of your fellow employees.

THE TRUST OF SUCCESS

EACH motorman and conductor is a stockholder in the Trust of Success. The capital which he puts into this corporation is his enthusiasm, his thoughtfulness and his industry, and the dividends which he draws are the notice of his "higher ups," promotion in position, and increased salary. There are numbers who have risen from the platform to an office marked "private," but not one of these has gone up by chance. Each has been impelled by a desire to progress and has been forced to utilize his best thought and persistent industry. Each has kept before him the one hope that some day he would be included in the list of officers of his company, and with this constantly in view has put himself whole-heartedly into the battle.

Don't follow your inclinations unless you first have reasoned out where they are leading you.

CHANGES OF ADDRESS

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



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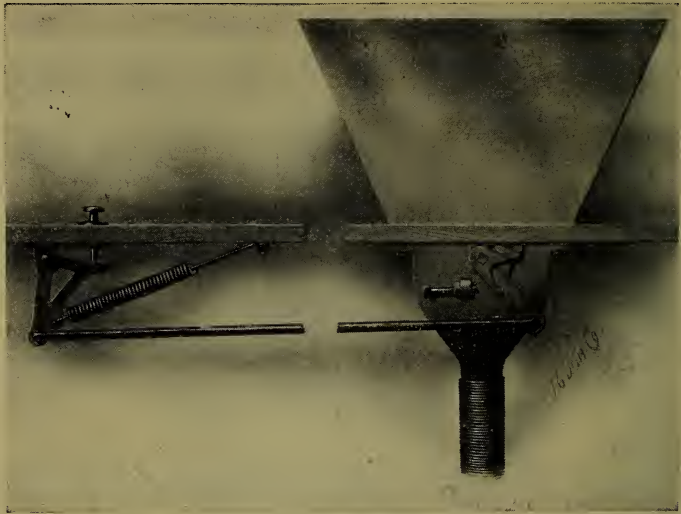
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ITALY—Giovanni Checchetti, Piazza Sicilia 1, Milan



THE BRILL "DUMPIT" SANDBOX

PATENTED

THIS is the time of the year when slippery rails, which fall and its attendant rains and fogs and wet, decayed leaves bring to us, force the careful manager to the consideration of safety precautions. Although the sanding of a track is well known to be an art of itself, the installation of a reliable sandbox forms an effective safeguard against careless or inefficient motormen. The Brill "Dumpit" Sandbox gives the motorman an even flow of sand just when he needs it and where he needs it—in a continuous stream in front of those spinning, slippery wheels. Because of the double-hopper feature of the box, there is no chance of water creeping up the hose (through a wick formed by mud and dirt) and getting into the sand, converting it into a wet, sticky mass.

The sand in a Brill Sandbox is kept dry and ready for instantaneous service.

BRILL MAGAZINE





BRILL SPRINGS

IN buying your springs from The Brill Company you are assured of having the quality of all your springs absolutely up to the high standard set by Brill manufacturing methods. All springs turned out by the Brill shops are made from high-carbon, low-phosphorous steel and each spring is tested separately for deflections under predetermined loads, the test being made by the most efficient hydraulic testing machines. Brill springs will give you a degree of service to which you are not accustomed unless you already are using Brill springs. If you are not equipped with Brill springs there is no time so good as the present for placing your order for replacements with us. We are in a position to make good deliveries. Write us now, telling us that you would like further particulars as to prices, etc.



Van Horn Ely

PRESIDENT, NATIONAL PROPERTIES COMPANY

During the year 1916 the gross earnings of the electric railway companies, both city and interurban, have shown large increases. This has been more noticeable in the sections of the country where so-called war orders have been in process of execution, as manufacturers have been forced to greatly enlarge their facilities for doing business and to increase the amount of labor employed. For the first eight months of the year the net earnings of the railway companies have shown substantial increases, but the advance in wages paid trainmen and other employees and the greatly enlarged prices for material and supplies used in the operation of the companies will tend to decrease the net earnings of the electric railway companies for the remainder of the year.

The extraordinary business offered the electric railway companies for the last eighteen months has called for additional equipment, resulting in large orders to the car builders, who have made every effort to accommodate the trade with cars but under conditions which have been most trying.

The experience which the operators of electric railway companies have gained on account of the extraordinary business offered to their companies during the last year or two—and which has been so well cared for—has produced a greater efficiency in the management of the companies from which the public will derive the benefit in the future.

As the result of the new equipment added to the service and the increased maintenance of track and other improvements which have been necessitated by increased traffic, the physical properties of electric railway companies will be in much better operating condition than would have obtained had only the ordinary increase in business been offered.

VAN HORN ELY

DECEMBER 15, 1916

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VAN HORN ELY

VAN HORN ELY was born July 28, 1866, at Lockport, Niagara County, N. Y., the son of Ellsworth Ely and Mariah Louise Van Horn. His father was born on the banks of Seneca Lake and his forebears lived at Old Lyme, Conn. Richard Ely, the founder of the Ely family in America, came from Hull, England, and settled in Old Lyme, Conn., in 1660. The Van Horn family, one of the patroon Dutch families that settled in New Amsterdam, now New York City, came from Holland in 1665.

Mr. Ely was graduated from the Lockport (N. Y.) Academy in 1884, and the Buffalo High School in 1885. From 1888 to 1894 he was junior member of the real estate firm of Bell & Ely, and later was successor to the firm until 1899 in Buffalo, N. Y. In June, 1899, he became assistant to the President of the International Traction Company, of Buffalo, controlled by J. P. Morgan & Co., and there he remained until March, 1905. This company owned and operated street railways in the cities of Buffalo, Niagara Falls, Lockport and Tonawanda, and the Niagara Belt Line and Gorge Railroad, operating on the Canadian and American sides of the Niagara River between the Falls and Lewistown and Queenstown. From June, 1905, to May, 1910, Mr. Ely was President of the street railways and lighting properties for 75 miles along the Ohio River between Pittsburgh and Beaver, Penna., and East Liverpool and Steubenville, Ohio, and Wheeling, W. Va. On May 1, 1912, Mr. Ely incorporated the National Properties Company, a holding company which has acquired public utilities in many cities of the east and central west. In January, 1916, the National Properties Company acquired The American Railways Company, which owns and operates electric light and railway properties in twelve cities, including Wilmington, Del.; Chester, Scranton and Altoona, Penna.; Springfield and Dayton, Ohio; Joliet, Ill.; Huntington, W. Va., and Lynchburg and Roanoke, Va.

INTERURBAN CENTERS AND INTERURBAN CARS

PORTLAND, OREGON



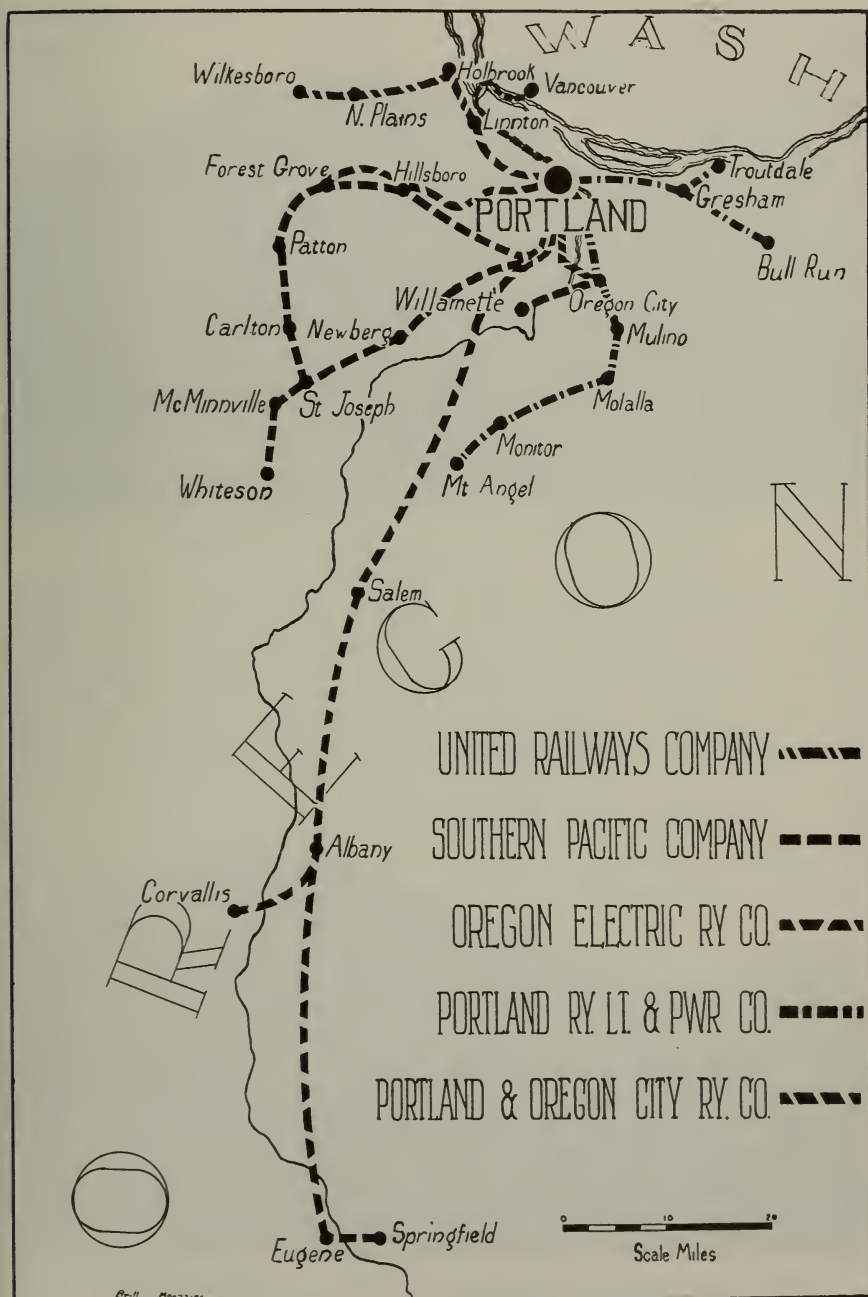
PORTLAND, the largest city in Oregon and county seat of Multnomah County, is located about 120 miles in-

land from the Pacific Ocean, at the confluence of the Columbia and Willamette Rivers. The city, which had a population in 1910 of 207,214, covers an area of about 66 square miles. Its present population is close to 300,000. The city covers part of the peninsula between the Columbia and the Willamette Rivers, the main part of the city being located on the two banks of the Willamette, about 12 miles from the Columbia. Most of the city spreads over an easy slope ranging from 30 to 150 feet above sealevel. Despite this fact, from many places in the city there are visible four snow-capped mountains of the Cascade Range. The most famous of these are Mount Hood, in Oregon (11,225 feet), and Mount Ranier, at Tacoma, Washington (14,470 feet).

The climate of Portland and its immediate surroundings—and in fact the climate of the whole state of Oregon—is equable. The temperature seldom rises above 90 degrees in summer and only occa-

sionally falls below the freezing point in winter; it is very seldom that the temperature goes as low as 20 above zero. The average rainfall is 45 inches. The reason for this mild climate is that the prevailing winds come from the west directly off the Pacific Ocean, and since winter and summer the temperature of this vast body of water varies but little, the air currents which pass over it are warmed in winter and cooled in summer and these temperate winds work the same effect upon the land, warming it in winter and cooling it in summer. Not only do these winds from the Pacific control the temperature of the land, but, being impregnated with the moisture from the ocean, they help nourish the crops, making the soil fertile. Also, this moisture covers the hills with timber, and lumber long has been one of the chief industries of the state.

The city of Portland is better favored with railroad connections than is perhaps any other city on the Pacific Coast. It is the only city on the Pacific Coast to which traffic naturally gravitates on a down-grade run from the region west of the Rocky Mountains. The city is served by the Northern Pacific, Great Northern, Union Pacific and the Southern Pacific Railroads, and it has traffic connections with the Chicago, Milwaukee & St. Paul, the Burlington





INTERURBAN CENTERS AND CARS. Oregon Electric passenger station in Salem, Oregon's capital

and the Canadian Pacific Railroads. The railroads using the passage of the Columbia River are the Union Pacific, the Great Northern and the Northern Pacific. The North Bank Line, finished in 1908, was built down the Columbia River by the Northern Pacific and the Great Northern at a cost of \$45,000,000, paralleling the Union Pacific on the south bank of the

river. This new road gave great impetus to the progress of Portland, and in fact the rivalry between the railroads has been of large benefit to the city, the rival roads having spent vast sums of money for the construction of extensions into the interior of Oregon.

In addition to the advantage which the city enjoys because of the large number of important railroads serving it, its progress has been greatly aided by the extensive systems of interurban electric lines which have their terminals in the city. There are electric interurban lines connecting Portland with Salem, capital of the state, 52 miles south



INTERURBAN CENTERS AND CARS. Employee's residence at Orville, Oregon Electric Railway

of Portland, and with Eugene, 125 miles, where is located the state university. Also there is an inter-urban line connecting Portland with Forest Grove, which is the seat of the Pacific University; with Cazadero, 37 miles, where is located a large hydro-electric plant;

with Oregon City, 15 miles, where the falls of the Willamette River are used for power purposes; with Vancouver, Washington, 7 miles, and with Bull Run, 30 miles.

Portland has the only important fresh-water harbor on the Pacific Coast. The basin of the Columbia River and its tributaries drains about 250,000 square miles. The agricultural products of the territory surrounding Portland are varied. The chief of these agri-



INTERURBAN CENTERS AND CARS. Substation at Orville, on Oregon Electric

cultural products is wheat, of which cereal there is produced annually a total of between 50,000,000 and 60,000,000 bushels. The exports in addition to wheat are featured by lumber shipments, both coastwise and by rail. The chief article of manufacture is lumber, and in fact Portland is noted as the greatest lumber-producing city in the world. The city ships by rail and by water large quantities of farm products,



INTERURBAN CENTERS AND CARS. Special hop pickers' train, Oregon Electric. The annual exodus from the cities to the hop and berry fields in the Willamette Valley constitutes a feature of traffic on this line



Freight train—Willamette Valley
Bridge over Willamette River; 109 feet above low water;
2600 feet of trestle; 800 feet of steel



OREGON ELECTRIC RAILWAY

Typical stretch of double track
Double track entering South Portland; Willamette River below on right
A seventeen-mile tangent through Willamette Valley, south of Portland



INTERURBAN CENTERS AND CARS. Special train of baggage cars, Oregon Electric.
A feature of such special movements as hop pickers

the famed Oregon apples being one of the most important products. In addition to its lumber business Oregon is noted as one of the greatest wool-producing states.

With Portland as the center of trade, the commerce of the city reaches the Orient, Europe, Africa, South America, Hawaii and Australia. Portland is the center of the Columbia River salmon trade, a business which is taking on larger and larger proportions annually. In addition to lumber, the city manufactures flour, woolen goods and clothing, furniture, cordage, machinery, steam boilers, etc.

The city has a public water system which embraces about 410 miles of water

mains and which gives the city an available daily supply of 67,500,000 gallons of water. The chief source is the Bull Run River, in the foot of the Cascades, 33 miles distant from the city. Four free bridges span the Willamette and in addition there are two big viaducts which were built in 1912. The city has two drydocks, and a great deal of attention is being paid to the docking system, which at present totals about 32,000 run-



INTERURBAN CENTERS AND CARS. Passenger station at Albany, Oregon. Oregon Electric Railway



INTERURBAN CENTERS AND CARS. Concrete substation and employees' residences at Lasen, near Eugene, on the Oregon Electric

beauty of the landscape, the undulating valleys, beautiful rivers and the verdure which is so characteristic of the state all lending enchantment to the view. Crater Lake, in southern Oregon, is one of the natural wonders of the world and is the mecca of camping

ning feet of docks and warehouses.

The Columbia River Highway, the great roadway recently built through the Cascade Mountains at a cost of about \$2,000,000, extends for about 47 miles east of Portland. The electric railways do an enormous Sunday business in bringing people to Portland to enjoy the scenery along this highway. Oregon as a whole, and western and southern Oregon particularly, are characterized by the

and sightseeing parties. Fishing and hunting both are excellent throughout the state, the many streams which have their source in the Cascade Range being well stocked with gamy fish. Crater Lake is but one of many interesting points that are reached by the Columbia River Highway, and so it may be seen that the electric roads linking the people of the state with this interesting highway naturally would reap large bene-



INTERURBAN CENTERS AND CARS. Georgian Colonial type of passenger station, Oregon Electric Railway. Recently completed

fits from holiday sightseeing and excursion traffic.

The Southern Pacific Company operates 96 miles of electrified track—94 miles of which is single track—out of Portland. This line connects Portland with Whiteson by way of Hillsboro, Forest Grove, St. Joseph and McMinnville, and also it operates a line from Portland to St. Joseph by way of Newberg. In addition, city lines are operated at Springfield, Salem, West Oregon City, Albany and Eugene, the latter city being the southern terminus of the Oregon Electric Railway Company. Also the Southern Pacific operates two short interurban lines, one running from Eugene to Springfield, a distance of five miles, and the other running from West Oregon City to Willamette, a distance of six miles. These two short lines present a rather interesting situation, neither of them being connected with the rest of the Southern Pacific's interurban trackage.

The electrified lines of the Southern Pacific formerly were steam lines, and therefore they have direct connection with the remainder of the Southern Pacific steam system at Portland and at Whiteson. Also at Portland connection is made with the Oregon - Washington Railroad & Navigation Company, the Northern Pacific, the Oregon Electric, the



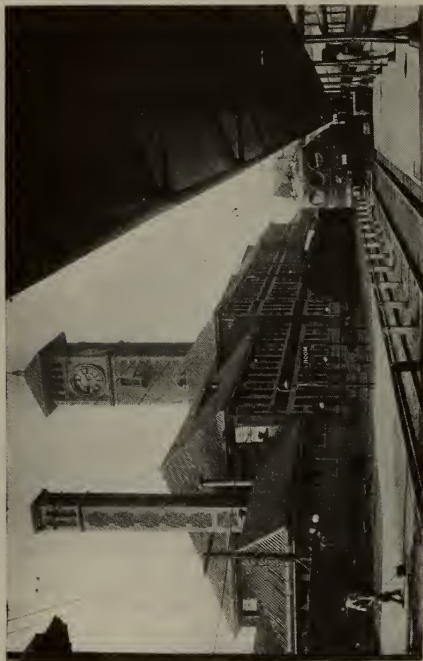
INTERURBAN CENTERS AND CARS. Portable substation of Southern Pacific

United Railways and the Portland Railway, Light & Power Company, from which latter company all the power used in the operation of the lines is purchased.

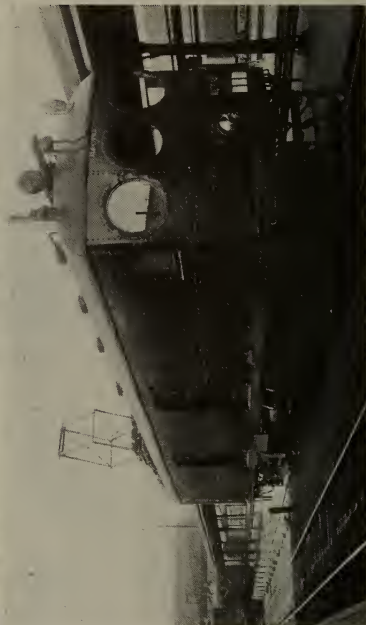
Aside from Portland, the terminus of the Southern Pacific lines, there are four fairly large towns on the line. These include Hillsboro, 4,000; Newberg, 32,000; Forest Grove, 3,000, and McMinn-



INTERURBAN CENTERS AND CARS. Junction at Fourth and Jefferson Streets, Portland. Southern Pacific line



Portland Terminal
Baggage and express car



SOUTHERN PACIFIC RAILROAD



Standard passenger coach
Typical station



ville, 3,500. In addition, it is estimated that the company has a total tributary population from rural districts of about 10,275.

The standard car measures 54 ft. 10 in. over the vestibules, 56 ft. 10 in. over the bumpers, 9 ft. 2 in. over the side sheathing, has a seating capacity of 60, and a weight of carbody including brake and electrical equipment of 29 tons, the total weight of car and trucks fully equipped being 51 tons. The standard car is built on a steel underframe with the girder type of side construction.

Steam operation is used to take care of the freight business. Farm products and consignments from the Wells Fargo Express Company make up a sizable express business.

Traffic statistics for the year 1915 showed a total of 20,541 trains operated with a total train mileage of 549,363, and a total car mileage of 1,428,271. Within the next year it is purposed to electrify the steam track between Whiteson and Corvallis.

Both the United Railways Company and the Oregon Electric Railway Company are under the control of the Spokane, Portland & Seattle Railway Company. The Oregon Electric connects Portland with Hillsboro, Forest Grove, Salem, Albany, Corvallis and Eugene. It operates a total of 195 miles of track with an equipment which includes 58 passenger motor cars and twenty-four other passenger cars, ten electric locomotives, 122 freight cars and 17 miscellaneous cars. Like the Southern Pacific, the company purchases its

energy from the Portland Railway, Light & Power Company, transmission voltage being 60,000 and the trolley voltage 1,200.

The United Railways Company connects Portland with Linnton, Burlington, North Plains and Wilkesboro. The line operates from Wilkesboro to Linnton, at which point it forms a junction with the steam line of the Spokane, Portland & Seattle Railway, operating into Portland. The territory served by this line exclusive of Portland has a population whose total is about 10,000, the towns served by the line being comparatively small. Like the Southern Pacific, this company purchases its power from the Portland Railway, Light & Power Company, maintaining a substation at Harborton. The transmission voltage is 1,200. At Linnton the Oregon Electric connects with the Spokane, Portland & Seattle and in the North Bank Station, Portland, it connects with the Oregon Electric Railway and other lines.

The standard car of the company measures 56 ft. 3 in. over the vestibules, 59 ft. 2½ in. over the bumpers, 8 ft. 7¾ in. over the side sheathing, has a seating capacity of 66 and a carbody weight, including brake and electrical equipment, of 49,552, the total weight of car and truck, fully equipped, being 84,500 lb. The cars are built for double-end operation on composite underframes, being of Pullman wooden construction. They are run singly and in trains of up to four cars.

The Portland Railway, Light &

Power Company connects Portland with Oregon City, Troutdale, Gresham, Cazadero, Bull Run and St. Johns, Oregon, and with Vancouver, Washington. Through ownership of stock this company controls the Willamette Valley Southern Railway and the Yamhill Electric Company. Also it owns the ferry system across the Colum-

from 12½ to 15 per cent. of the power generated by the company and about 33 per cent. of the total transformed for railway service is used for interurban operation. The company maintains ten power plants, five of them located on mountain streams and consequently being equipped with hydraulic machinery and the other five being



INTERURBAN CENTERS AND CARS. Bridge on Springwater Division of Portland Railway Light and Power Company

bia River to Vancouver and the Portland-Troutdale Electric Railway Company. Altogether the company operates 76 miles of first track and six miles of second track. Its connection with the Willamette Valley Southern Railway is made at Oregon City.

The company generates not only the power used in the operation of its own interurban line but it furnishes power to other industries, prominent among them the interurban roads previously mentioned as purchasing power from it. The records of the company show that

steam plants located in towns and cities. The capacity of these powerhouses is 65,000 kw.

The standard car in use by the company measures 49 ft. 10 in. over the vestibules, 51 ft. 1 in. over the bumpers, 8 ft. 10½ in. over the side sheathing, has a seating capacity of 56, a carbody weight, including brake and electrical equipment, of 35,640 lb. and a total weight of car and trucks, fully equipped, of 61,600 lb. The car is built for double-end operation on a composite underframe with wooden side construction. Although some of



PORTLAND RAILWAY, LIGHT & POWER COMPANY

Linnemann Junction station
United States mail and express car

Typical two-car train
Sellwood car houses 45-ton freight motor

the short runs are operated with single cars, trains usually are used. Brill 27-E Trucks are used.

Traffic statistics for the last year showed a total of 4,000,800 passengers carried, of which number 3,280,500 were revenue passengers, 547,000 were transfer passengers and 180,500 were non-revenue passengers. For this operation the carmiles totaled 1,593,000, with a total of 119,000 carhours.

The Portland & Oregon City Railway is a road about 16 miles long, extending from a point in

East Portland to Baker's Bridge on the Clackamas River, passing through the towns of Milwaukie and Clackamas, both towns being located in Clackamas County. At present the line is being operated with a steam locomotive and coach for passengers and also an automobile bus is operated from East Portland across the bridges to the hotel district on the west side. Just what type of electric traction will be used when the construction work has been completed has not as yet been decided.

SEMI-CONVERTIBLE CARS FOR WATERBURY & MILLDALE

BRILL 76-E TRUCKS

THE Waterbury & Milldale Tramway Company is one of Connecticut's youngest electric railways, but at the same time it is one of the most progressive. The line was put in operation in

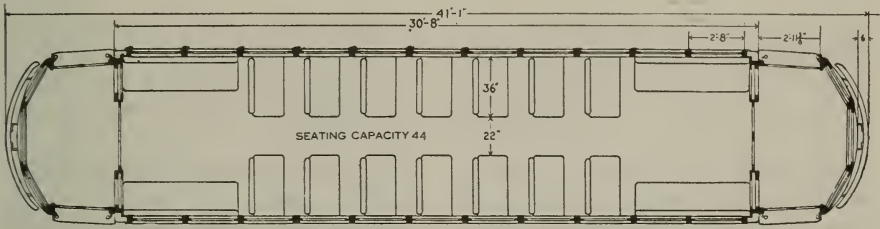
is attractive to the riding public is attested by the increasing revenue of the new company, which increase in business recently has made necessary the purchase of two new cars. Originally, four



SEMI-CONVERTIBLE CARS FOR WATERBURY & MILLDALE. The Semi-convertible window arrangement has proved particularly pleasing to the patrons of the company, because of the adaptability of the car to both summer and winter service

its entirety in December, 1914, as a more direct route between Waterbury and Milldale (at which latter point connection is made for Meriden, Southington, New Britain and Hartford), part of the line having been opened previously—in November, 1913. Previous to the opening of the line the best route between Waterbury and Milldale was thirteen miles long, and that the shaving of four miles off this route—with a reduction of fare from twenty to fifteen cents—

cars were built for the company by the Wason Manufacturing Company, of Springfield, Mass., and this equipment has been rendering such excellent service that when the purchase of new cars became necessary there was no hesitancy as to the placing of the order, and the new cars were ordered from the Wason Manufacturing Company. The officials of the company report greatest satisfaction with the cars—both the old and the new orders—and



SEMI-CONVERTIBLE CARS FOR WATERBURY & MILLDALE. Height from track to underside of side sills, 2 ft. 9 $\frac{3}{4}$ in.; height from underside of side sills over trolley boards, 8 ft. 3 in.; height from floor to center of headlining, 7 ft. 8 $\frac{1}{2}$ in.; track to step, 15 in.; step to platform, 15 in.; platform to floor, 9 in.; weight of carbody, complete, 21,000 lb.; weight of trucks complete, less gears, 6190 lb.

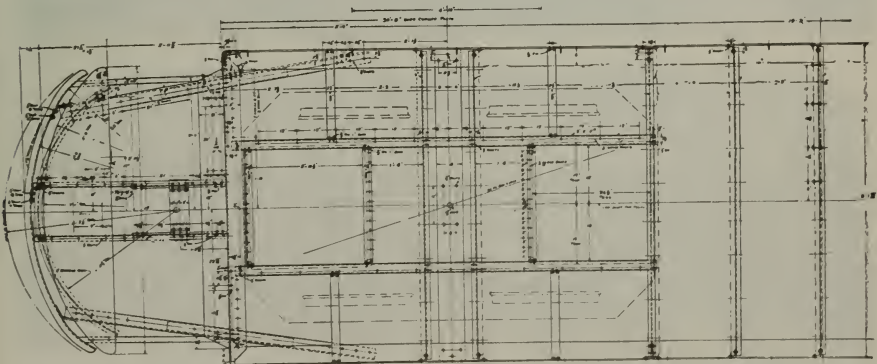
declare they are giving excellent service. The Brill semi-convertible window arrangement has been particularly pleasing to the officials.

The cars have been found in service to be light in weight and therefore economical to operate, but at the same time they have been found to be strong enough to stand up under heavy demands. The older cars were mounted on Brill 27-M. C. B. Trucks, built for high-speed interurban work, but for the new cars the Brill 76-E Truck was selected by the company as the desirable type. This truck is of somewhat the same design as the Brill 39-E, except that all four wheels are of the same

size. It is intended for service in which heavier grades make the use of four motors necessary. Also, it has been used extensively for suburban work.

The roadbed is gravel ballasted and is single track. Power for the operation of the cars, which are run on half-hour schedules, is purchased. The schedules call for an average speed of fifteen miles per hour. In summer considerable increase in traffic is noticed, due to the fact that the company serves a lake resort.

The cars are operated on the post-payment method of fare collection, three fares being collected between Waterbury and Milldale.



SEMI-CONVERTIBLE CARS FOR WATERBURY & MILLDALE. The side sills are of angle, the crossings I-beams and channels, and the bolsters are of the built-up type

There are seven cross seats on each side of the car and a longitudinal seat in each corner, built so as to occupy the space of two windows, these longitudinal seats—with a total capacity of sixteen persons—bringing the seating capacity of the car up to forty-four persons.

up type, the plates measuring 8 by 1 in. and 8 by $\frac{3}{4}$ in.

In the body framing top plates of 3 by $2\frac{1}{2}$ -in. angle are used, the posts being of $1\frac{3}{4}$ by $1\frac{3}{4}$ by $\frac{5}{16}$ -in. tees and the side plates of $\frac{3}{32}$ -in. steel. The roof is of the plain arch type, strengthened



SEMI-CONVERTIBLE CARS FOR WATERBURY & MILLDALE. The cars are operated on the post-payment method of fare collection, three fares being collected between Waterbury and Milldale

The cars are built on steel underframes in which the side sills are 6 by $3\frac{1}{2}$ -in. angle, the crossings 3-in. I-beams and 4-in. channels, the outside platform knees of angle the same dimensions as the side sills and reinforced under the end sills with 3 by 2-in. angle and the center platform knees of channel. The bolsters are of the built-

with concealed steel rafters, forged to the shape of the roof in a solid piece with a foot at each end, which feet are fastened to the top rails. The windows have tandem sashes, the upper and lower sash hinged together and arranged to slide into the roof after the usual method of the Brill semi-convertible window system.

NEW EQUIPMENT FOR HOLYOKE, MASSACHUSETTS

STEEL UNDERFRAMES

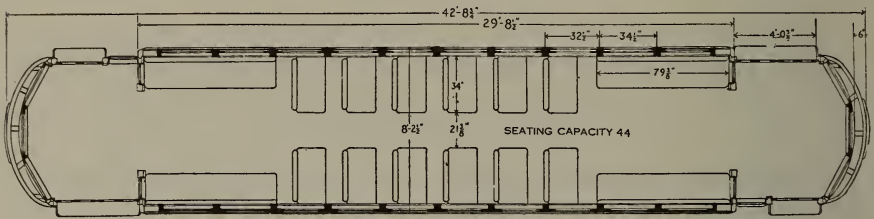
FIVE closed cars recently were delivered by the Wason Manufacturing Company, of Springfield, Massachusetts, to the Holyoke Street Railway Company, of Holyoke, Massachusetts, to supplement the equipment of the company, it not being the intention to replace any of the old cars but to widen the scope of the service rendered by the company. The company operates in Holyoke, with connections to Springfield, Westfield, Chicopee, Chicopee Falls, Northampton and Amherst, Massachusetts. The population of Holyoke is 65,000; that of Westfield, 17,000; Northampton, 20,000; Chicopee, 25,000; Amherst, 5,000 and Springfield, 105,000, making a total population of 237,000, exclusive of the population of the various rural settlements through which the lines of the company operate. Chicopee and Chicopee

Falls are manufacturing cities and the others are inclined to be rural except Springfield, which is a manufacturing center.

Traffic is pretty well distributed over the lines, there being but one section where traffic is heavier than others—in the center of the city at the city hall. The cars of the company are operated at a speed of 15 miles per hour, the estimated number of stops being five per mile. The operation of the company feels the changes of season very perceptibly; six months it keeps about even, during three months its patronage drops and it loses slightly and during the other three months it picks up again and dividend-producing profits are reaped by the company. The new equipment is so designed that the company hopes to use it nearly the whole year round, the windows being arranged so that they may



NEW EQUIPMENT FOR HOLYOKE, MASSACHUSETTS. Five new cars, of the prepayment type, have been built for the company. They will serve as a supplement to old equipment

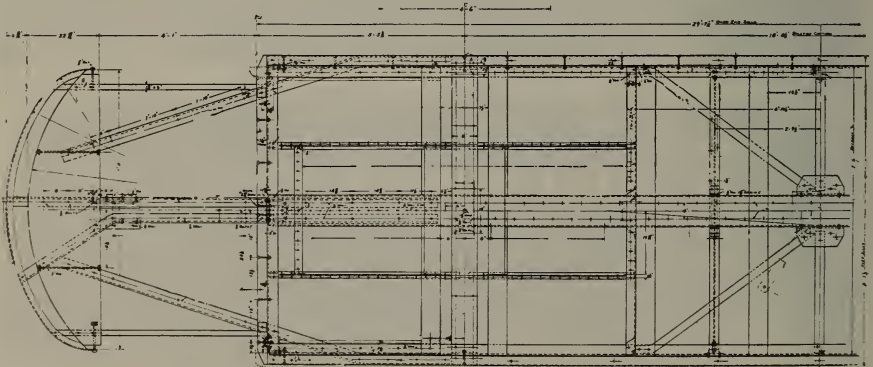


NEW EQUIPMENT FOR HOLYOKE, MASSACHUSETTS. Height from track to underside of side sills, 2 ft. 9 1/2 in.; height from underside of side sills over trolley boards, 8 ft. 4 1/8 in.; height from floor to center of headlining, 7 ft. 4 1/2 in.; track to step, 14 1/2 in.; step to platform, 14 1/4 in.; platform to floor, 10 in. with 2-in. ramp; weight of carbody, less electrical equipment, 16,900 lb.; weight of electrical equipment, 2585 lb.; weight of airbrake equipment, 1190 lb.

be removed in summer. This feature of the cars, in addition to the pay-as-you-enter design and the entering and leaving features are what particularly appealed to the officials of the company as making the type especially adaptable to their lines.

A good idea of the operating conditions is given by a comparison of the total number of passengers carried within the last year (13,731,224) with the total passenger car mileage (2,155,252), a very creditable ratio. The company runs through cars to Springfield over the lines of the Springfield Street Railway Company and to

Northampton and Florence over the Northampton Street Railway Company's lines. Also, it leases the Mt. Tom R. R. Co., which of itself forms a very considerable part of the business of the company. Mt. Tom, 1,300 feet above sea level, lies near Holyoke and at its summit there is a park known as Mt. Tom Park, which is leased by the company. In the park, in addition to the usual amusement features, there are several telescopes through which a wonderfully wide range of view is obtained. The scenery is known for its beauty and in fact is touted as being the finest in the New Eng-



NEW EQUIPMENT FOR HOLYOKE, MASSACHUSETTS. The bumpers are of channel, sills of Z-shaped steel, platform knees of angle and crossings of angle and I-beams. The center sills are of 10-in. channel

land states and the equal of anything in the country. From this summit Mt. Ascutney, eighty-five miles away, in the state of Vermont, can be seen very plainly.

The underframes upon which the cars are built are of structural

are fastened. Additional longitudinal members are used also in the panels on either side of the bolsters, these members being 2 by 2 by $\frac{1}{4}$ in. tees. The center platform knees, of 5 by 3 by $\frac{1}{2}$ in. angle, extend from the bolster to



NEW EQUIPMENT FOR HOLYOKE, MASSACHUSETTS. The windows are arranged so that they may be removed in summer, thus making the car comfortable for service all the year round

steel, the end sills being of 6 in. steel pressed Z-shape, the bumpers of 7 in. channel, platform knees of 6 by $3\frac{1}{2}$ by $\frac{1}{2}$ in. angle and the crossings of 3 by $2\frac{1}{2}$ by $\frac{1}{4}$ in. angle and 5-in. I-beams. In the center panel of the underframe diagonal braces of $2\frac{1}{2}$ by $\frac{5}{16}$ in. steel are used, tied to the side sills and to web plates to which the crossings and the 10-in. channel center sills

the bumpers, being brought down under the end sills.

The flooring of the car is double, $\frac{13}{16}$ in. both top and bottom, with a $\frac{1}{16}$ in. layer of paper between. Thus, a comfortable temperature in the winter months is promised. Fourteen heaters are provided with the car, ten of them located beneath the cross seats and four under the longitudinal seats.



OPEN CARS FOR CAMPINAS, BRAZIL. This car is of the type which is used so extensively in Rio Grande and other Brazilian cities. The first electric cars used by the company were built by The Brill Company in 1912. The 21-E Truck, used under these cars, has been specified in the majority of Brazilian cars

OPEN CAR FOR CAMPINAS, BRAZIL

BRILL 21-E TRUCK

ONE of the most recent orders completed by The Brill Company was an export shipment to the Cia. Campineira de Traccao Luz e Forca, of Campinas, Brazil, the type being the ten-bench open car which is used so extensively in Rio Grande and other Brazilian cities. In the majority of these cases the truck specified has been the Brill 21-E and this was also the case in the orders for Campinas. The first electric cars ever used on the Campinas lines were built by The Brill Company in 1912 and described in the July, 1912, issue of BRILL MAGAZINE.

Campinas is located in the eastern part of Sao Paulo in a

valley about 2,250 ft. above sea level. The district surrounding the city is rich in agriculture, being devoted chiefly to the cultivation of coffee of a high grade. The city, located about 70 miles from Sao Paulo, has a population of 28,000. It covers an extensive area and has several well-kept squares, the streets being wide and paved with stone. Manufacturing interests in Campinas are represented by cotton mills, shoe factories, ice factories and machine shops. However, these manufactories do not affect the street railway operation as much as does the nature of the surrounding territory, the county of Campinas being noted

as the most fertile and productive in the state of Sao Paulo. Campinas is connected by railway with Sao Paulo and Santos and with the western part of the state of Minas Geraes.

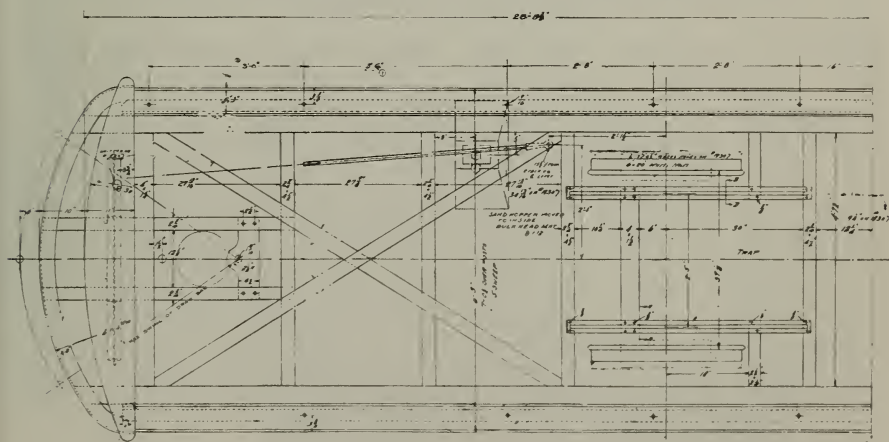
The equipment of the company, including the eight cars built in 1912 and this more recent order, totals fourteen cars. Of the old equipment four cars recently were taken from Campinas and put into operation in Paracicaba, of course creating a shortage in Campinas which will be filled by the new equipment. The new order differs somewhat from the type of the old, being almost identical in detail with the Rio Grande do Sul cars, which also were built by The Brill Company.

The cars are constructed on wooden underframes in which side sills of yellow pine, $3\frac{3}{4}$ by 7 in., the longer side plated with $\frac{1}{2}$ -in. steel plate, are used. The crown pieces are of oak, $2\frac{3}{4}$ by 11 in., and

the crossings of oak, $2\frac{3}{4}$ by $4\frac{1}{2}$ in. Both side and corner posts are of ash, the former $2\frac{3}{4}$ in. and the latter $3\frac{7}{8}$ in. thick, the posts being arranged with a sweep of 5 in. Of the ten benches six are made reversible, the two platform seats and the two seats inside the car at the bulkheads of course being stationary.

The roof of the car is of the monitor type, extending the full length of the car, the platform hood being of the standard shape and made detachable. The whole car was erected complete in every detail as though for domestic delivery and then was knocked down and packed for shipment.

The climate of the county in which the cars are operated is exactly suited to this type of car, the open design being exceedingly popular. Heavy duck curtains make the car waterproof and comfortable, pulling down to the sill from the letterboard.



OPEN CARS FOR CAMPINAS, BRAZIL. The underframes upon which this type was built are of wood, the side sills of pine plated with steel, the crown pieces of oak, and the crossings of oak. Both side and corner posts are of oak

CONVERTIBLE TYPE FOR STROUDSBURG

BRILL 21-E TRUCK

THE J. G. BRILL COMPANY recently delivered to the Stroudsburg Passenger Railway Company, of Stroudsburg, Pa., a 20 ft. 7 in. convertible motor car, very similar in design to the type of an order previously

track line connecting Stroudsburg and East Stroudsburg, serving a population of about five thousand in each town. These towns are $2\frac{1}{2}$ miles apart and a single fare is charged for the run between them. Because of the proximity of the



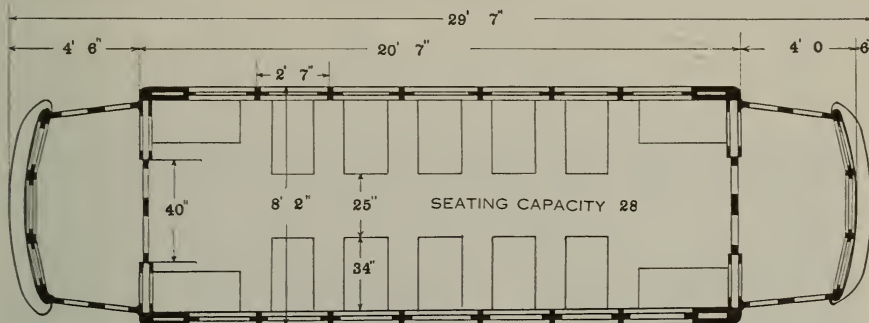
CONVERTIBLE TYPE FOR STROUDSBURG. This car, very similar in design to the type of a previous order except that it is longer by one window, will be used between Stroudsburg and East Stroudsburg, summer resort towns. Hence, its convertibility makes it well adapted for the operation, because of the all-year-round service which may be had with it

built for the company. The main point of difference is that the previous order was one window shorter than the car shown herewith. This increase in length in the new car made possible the installation of five transverse seats on each side of the car instead of four transverse seats as were used in the previous order. These five transverse seats, with longitudinal corner seats having a capacity of two persons each, give the car a seating capacity of 28 passengers.

The Stroudsburg Passenger Railway operates a short single-

line to the Delaware Water Gap and the tendency of both Stroudsburg and East Stroudsburg to take on the nature of summer resorts, the business of the company is very perceptibly greater in the summer due to the influx of summer boarders. Hence, the car shown herewith may be seen to be well adapted to the service, because of its convertible feature. The industries most prominent are boiler works, glass factories and silk mills.

The new car will be used as a supplement to the old equipment



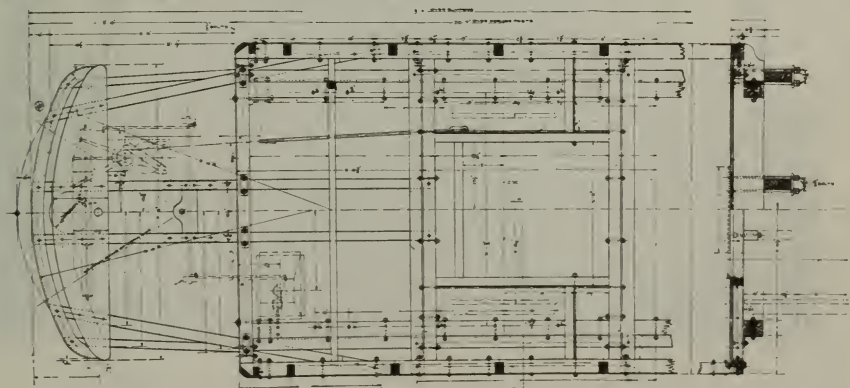
CONVERTIBLE TYPE FOR STROUDSBURG. Height from underside of side sills over trolley boards, 8 ft. 3½ in.; height from floor to center of headlining, 7 ft. 8 in.; weight of carbody, less electrical equipment, 10,565 lb.; weight of electrical equipment, 940 lb.; weight of truck, 5475 lb.; weight of motors, 4370 lb.; total weight, 21,350 lb.

of the company, especially to aid in taking care of the traffic on an extension which the company plans to build in the near future. At present the company is operating three single-truck cars. The officials of the company report that, judging from past experiences with the type, they expect to be able to quicken their schedule, thereby increasing, of course, the number of trips. At present the line is operated on a ten-minute schedule. The line-operating voltage is 550 and the company generates its own power

at its powerhouse in Stroudsburg.

The underframes embody side sills of 3¾ by 4 in. yellow pine plated with 5/16 by 10 in. steel plates, 3 by 3½ in. oak crossings, 3½ by 9¾ in. oak end sills and 4½ by 6 in. wheel pieces, reinforced with 6 by 3½ by ¾ in. angle.

There are seven windows on each side of the car, five of the window openings having removable panels and two having stationary panels. These stationary panels are of sheet steel, the intermediate removable panels being of



CONVERTIBLE TYPE FOR STROUDSBURG. The side sills are of yellow pine, plated with steel, the crossings and end sills of oak and the wheel pieces are reinforced with angle

wood. The two end openings are provided with a single light of glass in the upper portion of the panel, as are also the five intermediate openings. The removable panels are made interchangeable and are provided with arm rests placed on the inside of the panel.

The vestibules are stationary and round end, sheathed on the outside below the windows with wood. Each vestibule is provided with three windows with single sash arranged to drop, the center sash being provided with a rack to hold the sash at various heights.

In the body framing the corner

posts are $3\frac{5}{8}$ in. thick and the side posts $2\frac{3}{4}$ in. thick, the body framing being built throughout of ash and yellow pine, with white-leaded joints. The floor is of yellow pine with tapered floor mat strips in the aisle, running the entire length of the car floor except for a space of two inches at each end which is left for sweeping.

The roof is of the Brill Plain Arch type extending the full length of the car and supported on concealed steel rafters, forged to the shape of the roof and fastened to the top rail on either side.



CONVERTIBLE TYPE FOR STROUDSBURG. The new cars will serve as a supplement to the old equipment of the company, especially to take care of traffic on an extension which the company proposes to build in the near future. Brill "Winner" seats, upholstered in rattan, are used in the car



NEW CARS FOR PEOPLES' RAILWAY OF DAYTON, OHIO

BRILL 39-E TRUCKS

FIVE typical closed vestibule motor cars, with a length over body of 30 ft. 6 in., almost exact duplicates of a previous order for the same company, have been built for the Peoples' Railway Company, an American Railway Company property in Dayton, Ohio, by The J. G. Brill Company. The order of which these new cars are such close copies was described in BRILL MAGAZINE for August, 1916. The differences between the designs of the two orders are very small and the repetition of the order speaks for the efficiency of the service which is being rendered by the first cars.

The cars are mounted on underframes which are of steel throughout. The side sills are of 5 by 3 in. angles, the crossings of 4 in. channel, the diagonal braces of 3 by $\frac{3}{8}$ in. steel bar, and the bolsters of cast steel arranged so as to re-

ceive the center and outside platform knees. The outside platform knees are of 6 in. channel and the center platform knees are 4 in. channel, all knees fastened to the end sills with stirrups. The end sills are of 10 in. 15 lb. channel.

In the body framing the side posts are of $1\frac{1}{2}$ by 2 in. by 3-16 to $\frac{1}{4}$ in. tees, extending from side sill to side sill and forming the roof rafters. The center platform posts are of 2 by 2 in. tees and the door jamb posts are of angle of the same dimensions. The girder plates are 3-16 in. thick.

The roof is of the Plain Arch type, but not the full length of the car, the platform hoods being detachable and set down from the level of the roof so as to provide for the installation of bulkhead ventilators. Brill Patented Dendenda alarm gongs were among the specialties that were specified by the railway company.

COMBINATION WORK CAR AND SNOW PLOW FOR SALEM & PENNSGROVE

BRILL 54-E TRUCKS

FOR use on the fourteen - mile line of the Salem & Pennsgrove Traction Company, connecting Salem and Pennsgrove, N. J., The J. G. Brill Company recently completed a 28-ft. gondola car finished for service as a combination work car and snow plow with a live-load capacity of 25,000 pounds. The Salem & Pennsgrove Company is a new one and heretofore there has been no means of railway connection between the two cities served. Likewise there is no parallel line of transportation and it is necessary for the company to handle material required for maintenance which would have to be delivered to the company at either terminal and hauled to the desired point. The car shown herewith will take care of this requirement and in addition,

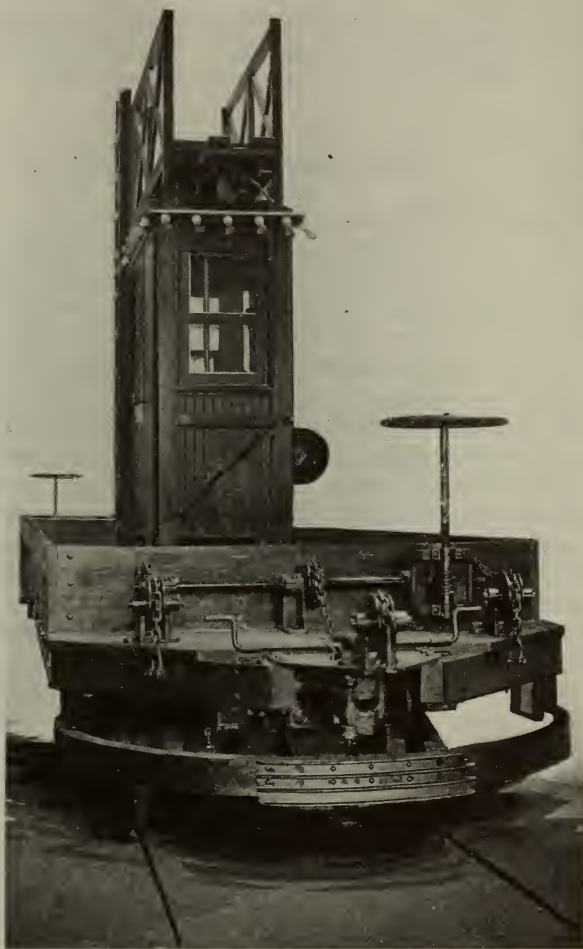


COMBINATION WORK CAR AND SNOW PLOW. This car is to be used by a new company operating fourteen miles of single track between Salem and Pennsgrove, N. J. Although winter weather conditions are not very severe, it was deemed advisable to be prepared for drifting in the open stretches of country through which the company operates. The car is mounted on Brill 54-E Trucks, an arch-bar type of truck with outside-hung motors which is very similar to the design of the Brill 50-E

through the detachable snow plow, it may be used to handle snow. Also, since the car is equipped with a tower, it may be used for line work. Although winter conditions are not as a rule very severe, the officials of the company deemed it advisable to make some provision for handling what snow might drift where the line passes through the open country.

Under ordinary conditions the population of Salem is about 7,000 and that of Pennsgrove about 2,300, with a small intermediate population scattered through several villages and hamlets. However, during the last year there has been an enormous increase in population due to the great manufacturing activity in a powder plant located below Pennsgrove and occupying the river front for a distance of several miles and employing at the present time about 17,000 men. The powder workers live in and about Pennsgrove and Salem.

On either side of the cab there is space for carrying rails. Also



COMBINATION WORK CAR AND SNOW PLOW. The plow and the substantially-designed plow guides are removed, showing the end construction, coupler and low-carried bumper

there are provided 16-in. hinged sides for handling ballast, which can be dumped on the track through trapdoors placed between the cab and the ends of the car. At one end of the car there is a small hand-operated derrick for handling light track material.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

BRILL RAILWAY PUBLICITY SERVICE

PUBLICITY for electric railways is coming into its own. Day by day the interest in the subject is becoming more intense and day by day railway managers are increasing the amount of attention they give to the subject. This was ably forecasted by the recent convention of the American Electric Railway Association at Atlantic City, at which convention more time and more deep thought were given to the matter of publicity than ever before. The recommendation for the appointment of what virtually would amount to a press association for the association shows in a striking way just how deep was the interest in the subject and just how it has struck home to the minds of the managers. The formation of such a press association probably will take some little time, the details connected with its complete organization making this so. Meanwhile there is in full operation a service whose aims are identical with those of the service which the association proposes to establish. This is the Brill Railway Publicity Service, which is co-operating with railway managers all over this and other countries in the preparation of their advertising copy, outlining of their campaigns of publicity work and in many other ways. This service is backed by the experience of the Brill staff of engineers with problems of car design, etc., and more especially by the experience of the Brill publicity staff in the problems of advertising and publicity which face the railway manager of today. For many years the Brill publicity staff has been in direct touch with the electric railway field, both through individual correspondence and through BRILL MAGAZINE articles, all of which are of course compiled from data obtained from the various companies. This experience and data are at the command of anyone connected with the electric railway field who cares to make use of them—and absolutely free of charge. It is our idea that anything that helps the railway business in general helps the car-building business and therefore the Brill Railway Publicity Service. This does not mean, however, that the service is open only to customers of The Brill Company and its subsidiary plants, because the services of the entire Brill publicity staff are entirely and without restriction at the disposal of any company or any individual in the field. And best of all the only restriction placed upon the service is that those who make use of it promise not to feel under any obligation to The Brill Company.

OFF-DUTY HOURS

HOW are you spending your off-duty hours? Not that it's any of our business, except in so far as it concerns your success in your own particular line of business. Are you reading anything that really is worth while? What are you doing in the way of exercise? Your body needs change from the work you give it to do all day. What would you think of a little study during some part of your day that is not spent on the platform? There are numberless books in the library and many trade papers which may be had from your company's office which it would be to your advantage to read. The men who are big in the railway business are reading these trade journals religiously for new thoughts, new ideas, new wrinkles. If they can afford to use their time thus would it not be worth your while? You should know something about what other companies are doing, what is being done in the way of improvements to equipment, roadbed, methods of operation. Do not ever hold your brain down to the job which you are presently occupying. Always keep your brain and your fund of knowledge a few jumps ahead of your pay envelope. There is no person, no corporation, in the world that is going to prove willing to pay you more money than you earn (often as you travel along your path of progress you will think you are not being paid *all* that you earn) and therefore it is up to you to drag your pay envelope's contents up to a point considerably above where it is now, simply by broadening out and getting new ideas and exchanging (even though it be at long distance) your ideas with those formulated by other men.

THINK

HOW many times have you heard a fellow-motorman or conductor make the lame excuse, "I didn't think?" How many times, after a bad accident, have you heard a platform man tell his chief that he "didn't think" to do this or that or the other thing? How many times, to your certain knowledge, have accidents occurred on your road or on roads with which you are acquainted which could have been avoided by someone's having used a little "think." Once I talked this thing over with a platform man. He was one of those disgruntled fellows who, thank goodness, are the exception rather than the rule on the platform of an electric car. He said he couldn't afford to think; he didn't get enough money—he wasn't paid for thinking. Could anything be worse? If there is one profession where a man has to have a quick brain and one that he can and will use it in in railroading, where the operating men constantly are faced with situations that shriek for instantaneous action. Suppose men thus faced by critical situations did not know how to think or, worse yet, "were not being paid to think." The disasters that would result are appalling to contemplate. Lest it seem

that the mechanical side of the job of the platform man is being ignored let me hasten to say that this has not for a moment been lost sight of. The job IS partly mechanical and yet there are jobs which are far worse in their tendencies to make a machine of a man. If you learn to think and are willing to think hard and often the day when you will be sitting at a desk doing nothing but thinking out orders for other men to execute is not far off. There IS a future in this business. Look at the men who began where you are now. But they early realized the value of THINK. Are you thinking?

AND NOW A NEW YEAR

THE dawn of a new year is upon us once more. Once more the cartoonists will give Old Father Time a race across the page with the infant New Year at his heels brandishing a weapon labeled "365 new days." Once more the illustrators will plaster upon the covers of magazines studies in the nude infant with a bit of ribbon draped nonchalantly across his wee chest bearing the news that he is Mr. 1917. Once more (at midnight, December 31st) bells will ring, whistles will shriek, horns will toot and laughter will ring out upon the chill air. It is the same old thing that we have been accustomed to doing and yet it never seems to grow boresome. Each year we grin at the cartoonists' efforts to annihilate Old Father Time, each year we smile in a self-satisfied fashion at the replicas of our own little two-year-old there on the covers of the magazines, each year we ring the bells and blow the whistles and toot the horns and each year our laughter, with all its New Year zest, rings out upon the air. And yet we never get tired of these things—they never pall upon us. Why? Because we know it is a fresh start that we are being given and we appreciate the gift of a bright, new, brand-clean year in which to correct the mistakes that have gone along behind us into the discard of time. Let us pass lightly over the pledges that will be signed on January 1st and broken on January 2d; let us not dwell upon the resolutions that will be broken ere they are twenty-four hours old, and let us greet enthusiastically this new lease on life, a fresh, clean page upon which we are to write anew our life as we find it or as we make it. And let us no longer write down on this page a series of events of life as we find it; let us buck up this year and make that new page set forth a story of "Life As We Make It." It's worth the while, the effort that this will take. It will repay in coin of the realm—of happiness. Let us stiffen our spinal columns and plunge into the work of the New Year determined to straighten it out so that it will be as it should be, not as it wants to be. Surely, with last year's scarred, bemarked page before us, we can pick out the mistakes and avoid against their repetition. Surely we can find courage to face the world with a new front, a new attitude toward life—an attitude of right living.

INDEX TO
BRILL MAGAZINE

Vol. 10—Jan.-Dec. 1916

Types of
Electric Railway Cars

	All-Steel Underframes	Composite Underframes	Plain-Arch Roof	Pass. Baggage & Smok.	Single-Truck	Center Entrance	Prepayment	Trailer	All-Steel	One-Man	Semi-Convertible	Front-Ent. Center-Exit	Baggage	Convertible	Interurban Passenger
*Albany Southern Railroad Co.	188		188					188							
Ashtabula Rapid Transit Co.		212	212				212								
Austin Street Railway	118		118		118										
Benton Harbor & St. Joe Railway	338		338			338									
Boston Elevated Railway Co.	285					285		285	285						
Bristol & Plainville Tramway Co.	205	205		205										205	
Buffalo, Lockport & Rochester	185		185						185				185		
Campinas Camp. de Tr. Luz e Forca			372		372										
Centralia Traction Co.	216		216		216				216						
Chambersb'g, Green. & Waynes. Ry.	248		248	§248							248				
‡Chattahoochee Valley Railroad Co.	209		209	§209											
Chicago & Interurban Trac. Co.	307			§307											307
†Cia. Hidro Elec. e Irri. del Chapala	180							180							
City Light & Traction Co.	273		273		273				273						
Cleveland Railway Co.	88		88									88			
Connecticut Company	84		84						84		84				
Detroit United Railway Co.	45					45	45	45	45						
Detroit United Railway Co.	282			§282				282							282
East Liverpool Trac. & Light Co.	50					50	50		50						
Empresa de Luz Fuerza Electrica					154										
Fort Dodge, Des Moines & Southern		14	14	14	14	14			14						
Hammond, Whiting & East Chicago	307						307								
Hershey Transit Company	176		176				176				176				
Holyoke Street Railway Co.	369		369				369								
Lehigh Traction Co.	78		78			78			78						
Northern Ohio Traction & Light Co.		24	24												
Northern Ohio Traction & Light Co.	251		251				251								24
Northern Ohio Traction & Light Co.		317	317												317
N. Y. State Rys.—Utica—Syracuse	304		304									304			
Ogden, Logan & Idaho Ry. Co.	114		114	114				114	114						
Ottumwa Railway & Light Co.	334		334		334				334	334					
Pennsylvania Railroad Co.	93								93				93		
Peoples Railway Company	241		241				241								
Peoples Railway Company	377		377				377								
Portsmouth St. R. R. & Light Co.	145		145	145		145									145
Portsmouth St. R. R. & Light Co.	183		183					183					183		
Public Service Railway Co.	269														269
Reading Transit & Light Co.		279	279				279				279				
Schuylkill Railway Co.	21		21				21		21						
Seranton & Binghamton Ry. Co.		346	346										346		
Staubenville Railway Co.	244		244				244		244		244				
Stone & Webster	109		109		109					109					
Stroudsburg Pass. Ry. Co.	374	374		374											
‡Towson & Cockeysville Elec. Ry. Co.		314	314		314										
Tucson Rapid Transit Company	59		59				59			59					
United Traction Co. of Albany	150		150		150		150								
Warren & Jamestown Ry. Co.	54		54	54		54	54								
Waterbury & Milldale Tramway Co.	366		366								366				
West Chester Street Railway Co.	238		238												
Wilkes-Barre & Hazelton Ry.	78		78	78					78						
Wilmington & Philadelphia Tr. Co.	138		138				138				138				
†Yumuri, Mat. & Bellamar Ry. Co.					342										

Express car

†Open car

‡Storage battery car

§Two-compartment car; no baggage

INDEX—Continued

MISCELLANEOUS ARTICLE

The Electric Railway System
of Madrid121

INTERURBAN CENTERS AND INTER- URBAN CARS

Allentown, Pa. 66
Fort Wayne, Ind.226
Lancaster, Pa.130
Louisville, Ky. 2
Newark, N. J.258
Oakland, Cal.194
Portland, Ore.354
Rochester, N. Y.162
Seattle, Wash. 34
Toledo, O.290
Vancouver, B. C. 98
Youngstown, O.322

BIOGRAPHICAL

Brooks, F. W.289
Byllesby, Henry Marison ...225
Coates, F. R.193
Ely, Van Horn353
Fehr, Harrison R. 65
Kidd, George 97
Leonard, Alton W. 1
McKinley, William Brown..129
Moore, Edward W.257
Pedriali, Giuseppe161
Pringle, Percival John....321
Sullivan, Jeremiah J..... 33

MISCELLANEOUS EQUIPMENT

Ash and Coal Car for Scranton & Binghamton346

Autobuses for Cambridge
Rapid Transit Co.219
Autobuses for Peninsula
Rapid Transit Co. 89
Combination Work Car and
Snow Plow—Salem &
Pennsgrove Ry. Co.378
Line Car for Northern Ohio
Traction & Lt. Co. 24

ADVERTISEMENTS (On second or fourth covers, facing or fol- lowing the pages given):

Brake Handle, Ratchet 1
Brake Hanger, "Half Ball,"
65, 224
Draw Bar, Radial129
Gong, "Dedenda" 97
October Convention Exhibit.288
Rattan, Twill Woven.....225
Sand Box, "Dumpit".....352
Seats, "Winner"193
Snow Plows289
Snow Sweepers, Gear Drive.257
Springs353
Sprinkler, "Centrifugal".... 64
Supplies and Specialties.... 33
Truck Construction, Impor-
tant Improvements320
Truck, "Radiax" 32
Truck, 21-E 96
Truck, 27-M. C. B.160
Truck, 39-E128, 321
Truck, 74256
Truck, 76-E192
Truck, 77-E384
Ventilator, "Exhaust"161



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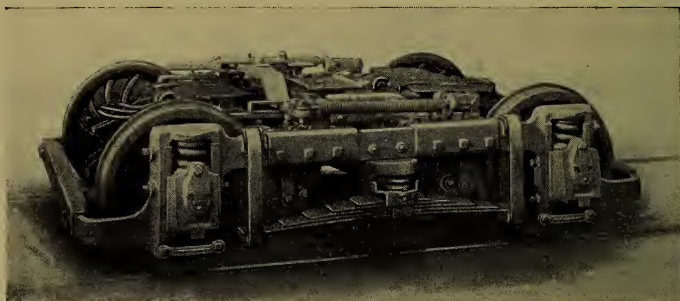
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THE BRILL 77-E TRUCK

THIS truck is very similar to the ever-popular Brill 39-E Truck, except that its wheels are of the same diameter and that it is driven by two motors instead of one, as is the case with the 39-E. Its general arrangement, however, is the same as that of the 39-E, the spring system being the same. As is the case with the other Brill trucks upon which they have been installed as a standard part of the design, the Brill Graduated Spring System and the Brill Bolster Guide, working in combination, have given to this truck a degree of riding quality which is superlatively good. The Graduated Spring System takes care of the car when loaded lightly as well as when more heavily loaded and gives a spring action which is uniformly good under all loads. The Brill Bolster Guide entirely obviates the necessity of using the old friction-producing chafing plates between transom and bolster which have heretofore proved such a detriment to the car. All vibrations, jars, jolts and shivers are lost in the guide link, whose bolster end merely turns on its pin.

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